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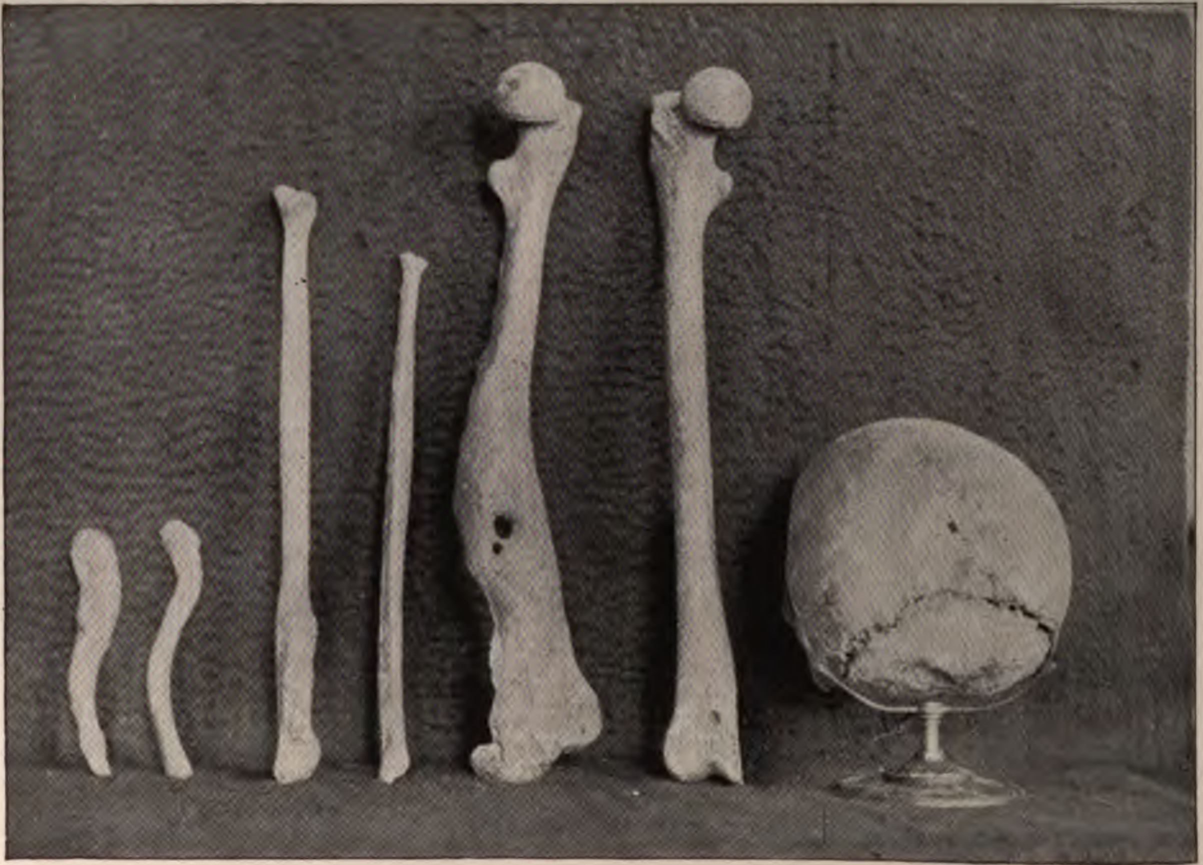
But books, I find, when often lent
Return to me no more.

Read slowly, and with frequent pause,
And eke with thoughtful mind;
But when returned no pencil marks
Nor dog's ears let me find.

PLATE I.



Portions of one Skeleton, from a Burial-mound in Colorado.

(From the Peabody Museum of American Archæology and Ethnology, Cambridge, Mass. Kindnes

A SYSTEM OF
GENITO-URINARY DISEASES
SYPHILOLOGY AND
DERMATOLOGY

BY VARIOUS AUTHORS

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EDITED BY

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WITH ILLUSTRATIONS

IN THREE VOLUMES

VOL. II

SYPHILOLOGY

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PREFACE.

The general plan and scope of this "System" have been fully set forth in the preface to the first volume.

In the preparation of Volume II it has been the aim of the editor, with the assistance of a corps of contributors of acknowledged eminence in their respective specialties, to produce a complete and systematic treatise on "Syphilis and Chancroid" which should be thoroughly up to date, embodying the most recent advances made in our knowledge of these diseases, and at the same time essentially practical.

With this object in view, many theoretical questions and unimportant details which occupy a prominent place in general treatises on these subjects, but which now possess only a historical interest, have been omitted, or dismissed with but brief mention—such, for example, as the Unity or Duality of the Syphilitic Virus, Syphilization, Formularies of Discarded Drugs, Obsolete Methods of Treatment, etc. The endeavor has been to present only the essential facts of our knowledge, and to discuss questions of live, practical interest.

The volume has been enriched by a careful gleaning of all that is most valuable in the numerous contributions made to the literature of syphilis within recent years, and its presentation in a compact and available form.

Modern bacteriological researches have given us a clearer conception of the important *rôle* played by micro-organisms in the production of syphilitic phenomena. While the theory of the bacterial origin of syphilis rests upon hypothesis rather than absolute demonstration, yet the general recognition of a specific microbe as the essential etiological factor, of the action of its toxines upon the tissues, and of the pathogenetic influence of pyogenic microbes, has thrown a flood of light upon the interpretation of many of the morbid processes of syphilis. Recent investigations into the pathology of syphilis have materially enlarged our knowledge of the vast complexus of its pathological relationships. The

relations of syphilis to tuberculosis, to rachitis, to tabes, and
obscure diseases of the nervous system, have received full cons
in the present volume.

The important subject of the relations of syphilis to public h
socio-economic aspects and the practical working of the legislat
ures employed in various countries for the repression of the so
have been intelligently and forcibly presented, with the author'
sions as to the most available methods of limiting the spread of s

With the view of meeting the wants of the general practiti
subjects of diagnosis and treatment have received more considera
is usually allotted to them in works of this class. In addition to
eral chapters on diagnosis, prognosis, and treatment, these subje
been considered in connection with the manifestations of syphili
ferent organs from the independent standpoint of the individ
tributor. In this way are conveyed many valuable suggestions a
tical points in diagnosis which admirably supplement the more
exposition of the subject, while the side lights thrown upon the
ment of special complications by so many skilled specialists can
to present the whole subject of treatment in a clearer and more
light.

The illustrations which accompany the different articles are
most part original, and, where not otherwise credited, have be
nished by the authors. The publishers have spared no expense in
them executed in the best possible manner. The newest and m
proved methods known to modern art have been employed i
reproduction. In addition to the typogravure, half-tone, and c
lithographic plates, two new processes have been employed. Pla
reproduced by the typogravure process in colors, which was disc
by Vogel, of Berlin, and developed by Kurtz, of New York. The
is obtained by photographing the three primary colors from whi
three color plates are made, thus assuring photographic accuracy
representation of the subject.

Plates III, IV, VI, and XII are reproduced by photograph
lithography combined. This is the first time that this process ha
applied to medical subjects; and the publishers call attention to
plates as being something unique.

NEW YORK. *June, 1893.*

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VOLUME II.

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J. WILLIAM WHITE, M. D.
JOSEPH ZEISLER, M. D.

CONTENTS.

SYPHILIS.

PAGE

HISTORY, GEOGRAPHICAL DISTRIBUTION, EVOLUTION, AND GENERAL PATHOLOGICAL ANATOMY OF SYPHILIS 1

BY JAMES NEVINS HYDE, A. M., M. D.,
Professor of Skin and Venereal Diseases, Rush Medical College, Chicago; Dermatologist to the Presbyterian and Michael Reese Hospitals of Chicago; and Consulting Physician for Diseases of the Skin, Chicago Hospital for Women and Children.

- History 1
- Geographical distribution of syphilis 14
- Evolution, course, and stages of syphilis 20
- Congenital (hereditary) syphilis 32
- General pathological anatomy 34

THE ETIOLOGY OF SYPHILIS 39

BY JOHN A. FORDYCE, A. M., M. D.,
Professor of Dermatology and Syphilology in Bellevue Hospital Medical College, Visiting Surgeon to the City Hospital.

- Micro-organisms in syphilis 40
  - Staining methods 41
  - Secondary infection of syphilitic lesions with pyogenic organisms . . 48
  - Predisposing causes 53
- Sources and vehicles of the syphilitic contagion 54
- Infectiousness of tertiary products 57
- Syphilis in animals 58

MODES OF INFECTION IN SYPHILIS 61

BY L. DUNCAN BULKLEY, A. M., M. D.,
Professor of Dermatology and Syphilis, New York Post-Graduate Medical School; Physician to the New York Skin and Cancer Hospital, etc.

- I. Direct contact 61
- II. Mediate contact 63
  - Vaccination 64
- III. Hereditary transmission 65
- IV. Maternal infection 66
- Syphilis insontium 67

PRIMARY SYPHILIS

BY EDWARD BENNET BRONSON, A. M., M. D.,
Professor of Dermatology in the New York Polyclinic; Visiti
to the City Hospital.

- The initial lesion
  - The "mixed chancre"
- The primary adenopathy
- Location of the lesions of primary syphilis
  - Differential diagnosis
  - Pathological anatomy
- Theory of primary syphilis

CONSTITUTIONAL SYPHILIS

BY JOSEPH ZEISLER, M. D.,
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cago Medical College and Women's Medical College; Dermatol
Michael Reese Hospital.

- Period of secondary incubation
- Prodromata
- State of the blood
- Syphilitic fever
- Affections of the ganglia
- Syphilitic cachexia
- Traumatism and syphilis

SYPHILIS OF THE SKIN.—SYPHILODERMA

BY PRINCE A. MORROW, A. M., M. D.,
Clinical Professor of Genito-Urinary Diseases in the University of
New York; Surgeon to the Charity Hospital; Attending Physi
Class of Skin and Venereal Diseases, New York Hospital.

- General symptomatology
  - Variations in type
  - Unusual modes of evolution
  - Etiological considerations
    - Causes of tertiarism
  - General morbid anatomy
- Classification of the syphilides
- I. The erythematous syphilide
  - The maculo-papular syphilide
- II. The papular syphilide
  - The miliary papular syphilide
  - The lenticular papular syphilide
  - The papulo-squamous syphilide
  - Palmar and plantar syphilides
  - The moist papular syphilide
- III. The pustular syphilide
  - The varicella-form syphilide
  - The acne-form syphilide
  - The impetigo-form syphilide
  - The ecthyma-form syphilide
  - The rupial syphilide
  - Pustulo-ulcerous syphilides
- IV. The tubercular syphilide
  - The gummatous syphilide

PAGE
The serpiginous syphilide 198
The vegetating syphilide 201
The pigmentary syphilide 202
Hæmorrhagic syphilis 205

SYPHILIS OF THE APPENDAGES OF THE SKIN—THE HAIR AND THE NAILS 207
By SAMUEL ALEXANDER, M. D.,
Professor of Genito-Urinary Surgery and Syphilis in Bellevue Hospital Medical College; Surgeon to Bellevue Hospital.
I. Affections of the hairs (alopecia) 207
Cranial alopecia 208
Alopecia of the eyebrows and eyelashes 210
Alopecia of the genitals and of the axillæ 210
Alopecia of the beard 210
II. Affections of the nails—onychia and paronychia 212

SYPHILIS OF THE MUCOUS MEMBRANES OF THE MOUTH AND TONGUE. . 223
By CHARLES W. ALLEN, M. D.,
Surgeon to the City Hospital; Consulting Dermatologist to the Italian Hospital.
Primary syphilis 224
Early consecutive syphilis 227
Tubercular syphilides 233
Ulcerating syphilides 234
Affections of the lingual tonsil 237
Late consecutive syphilis 241
Leucokeratoses 242
Gummata 246
Parasyphilitic manifestations 251

SYPHILIS OF THE JOINTS, MUSCLES, BURSÆ, TENDONS, AND APONEUROSES 255
By FRANK HARTLEY, A. M., M. D.,
Consulting Surgeon New York Cancer Hospital; Attending Surgeon New York Hospital; Instructor in Operative Surgery upon the Cadaver, College of Physicians and Surgeons, New York; Assistant Surgeon Roosevelt Hospital.
Syphilis of the joints 255
Myositis 260
Bursitis. 262
Tendons and sheaths of tendons 263
Aponeuroses 263

SYPHILITIC AFFECTIONS OF THE BONES 265
By W. R. TOWNSEND, A. M., M. D.,
Orthopædic Surgeon New York Infant Asylum; Orthopædic Surgeon French Hospital; Assistant Surgeon Hospital for Ruptured and Crippled; Lecturer on Orthopædic Surgery New York Polyclinic.
Gummata 265
Syphilitic periostitis. 266
Specific osteitis 267
Rarefying osteitis 267
Formative osteitis 268
Osteomyelitis 270
Acquired syphilis. 274

Inherited or hereditary syphilis
  Syphilitic pseudo-paralysis
  Fractures
    Differential diagnosis

DACTYLITIS SYPHILITICA
  Diagnostic table of syphilitic dactylitis, tubercular dactylitis, rheum
    tis, enchondroma, exostosis, paronychia, gout

SYPHILIS OF THE UPPER AIR-PASSAGES—THE NOSE, PHARYNX,
  TRACHEA, AND BRONCHI
    BY JOHN NOLAND MACKENZIE, M. D.,
      Laryngologist to the Johns Hopkins Hospital, and Clinical Profe
      eases of the Throat and Nose in the University of Maryland.
  Historical
  I. Acquired nasal syphilis
    Congenital syphilis of the nasal passages
  II. Syphilis of the pharynx
    Acquired syphilis of the pharynx
    Congenital syphilis of the pharynx
  III. Syphilis of the larynx.
  IV. Syphilis of the trachea and bronchi
    Congenital syphilis of the larynx, trachea, and bronchi
  Effect of certain acute morbid processes upon the throat affections ol

VISCERAL SYPHILIS
    BY W. T. COUNCILMAN, M. D.,
      Shattuck Professor of Pathological Anatomy, Harvard Medical Sch
  General consideration of the subject
  I. Syphilis of the placenta
  II. Syphilis of the heart and blood-vessels
    Syphilis of the pericardium
    Syphilis of the heart
      Heart aneurism
    Syphilis of the blood-vessels
  III. Syphilis of the lungs
    Congenital syphilis of the lungs
    Acquired syphilis of the lungs
  IV. Syphilis of the intestines
    Syphilis of the œsophagus
    Syphilis of the stomach
    Syphilis of the small and large intestines
  V. Syphilis of the liver
    Congenital syphilis of the liver
    Acquired syphilis of the liver
  VI. Syphilis of the spleen
  VII. Syphilis of the pancreas
  VIII. Syphilis of the suprarenal capsules

PAGE
SYPHILITIC AFFECTIONS OF THE RECTUM AND ANUS 417
By JAMES P. TUTTLE, M. D.,
Adjunct Professor of Surgery and Lecturer on Diseases of the Rectum and Anus, New York Polyclinic.
Secondary syphilis 419
Gummata 425
Ano-rectal syphiloma 426
Rectitis proliferante syphilitique 428
Stricture of the rectum 428
Congenital syphilis of the rectum 430

SYPHILIS OF THE GENITO-URINARY SYSTEM, MALE AND FEMALE. . . . 437
By EUGENE FULLER, M. D., New York.
I. Syphilis of the generative organs 437
The male organs—the penis 438
Syphilis of the corpora cavernosa 443
Syphilis of the urethra 444
Syphilis of the prostate 447
Syphilis of the seminal vesicles 447
Syphilis of the epididymis and cord 448
Syphilis of the scrotum 455
The female organs—the vulva 455
Syphilis of the vagina 461
Syphilis of the female urethra 461
Syphilis of the os uteri 462
Syphilis of the body of the womb, the tubes, and the ovaries 463
II. Syphilis of the bladder 464
III. Syphilis of the kidney 465
Hereditary renal syphilis 473

SYPHILIS OF THE NERVOUS SYSTEM 475
By B. SACHS, M. D.,
Professor of Mental and Nervous Diseases in the New York Polyclinic; Consulting Neurologist to Mount Sinai Hospital, to the Italian Home, and to the Montefiore Home for Chronic Invalids.
The pathological anatomy of syphilis of the nervous system 478
I. Syphilis of the brain and its meninges 481
Oculomotor palsies 490
II. Syphilis of the spinal cord and its coverings 493
Erb's type of spinal syphilis 498
Tabes and syphilis 499
III. Multiple cerebro-spinal syphilis 502
Mental disturbances following syphilis, including dementia paralytica . . 505
IV. Syphilis of the peripheral nervous system 510

HEREDITARY SYPHILIS OF THE NERVOUS SYSTEM 519
By WILLIAM N. BULLARD, M. D.,
Neurologist to the Children's Hospital, Boston.
I. Cerebral lesions of hereditary syphilis 521
Intracranial affections in hereditary syphilis 526
Affections of the brain, including the cerebrum, cerebellum, pons, and medulla 528

II. Spinal lesions of hereditary syphilis
III. Lesions of peripheral nerves in hereditary syphilis

SYPHILIS OF THE EYE AND ITS APPENDAGES

BY CHARLES STEDMAN BULL, A. M., M. D.,
Professor of Ophthalmology in the University of the City of New
geon to the New York Eye and Ear Infirmary; Consulting Ophth
geon to St. Luke's Hospital; to the Presbyterian Hospital; and to
Hospital for Children.

I. Syphilis of the lachrymal apparatus
  Lesions of the lachrymal gland
  Lesions of the lachrymal caruncle
  Lesions of the lachrymal passages, including canaliculi, sac, and n
II. Syphilis of the eyelids
III. Syphilis of the conjunctiva
IV. Syphilis of the cornea
V. Syphilis of the sclerotic
VI. Syphilis of the uveal tract, or iris, ciliary body, and chorioid
  Syphilis of the iris
  Syphilis of the ciliary body
  Syphilis of the chorioid
  Syphilis of the crystalline lens
  Syphilis of the vitreous humor
VII. Syphilis of the retina and optic nerve
  Syphilis of the retina
  Syphilis of the optic nerve
VIII. Syphilis of the ocular muscles and motor nerves
IX. Syphilis of the orbital walls and contents (exclusive of the adnexa of ball)

DISEASES OF THE EYE AND ITS APPENDAGES DUE TO INHERITED SY

BY CHARLES STEDMAN BULL, M. D.

I. Conjunctiva and eyelids
II. Lachrymal apparatus
III. Sclerotic and cornea
IV. Uveal tract—iris, ciliary body, and chorioid
  Iritis
  Chorioiditis
V. Hyalitis
VI. Diseases of the lens
VII. Retinitis and optic neuritis
VIII. Diseases of the muscles of the eye
IX. Diseases of the orbital wall

SYPHILIS OF THE EAR

BY J. ORNE GREEN, M. D.,
Professor of Otology in Harvard University.

I. Acquired syphilis of the auricle
II. Acquired syphilis of the meatus
III. Acquired syphilis of the membrana tympani
IV. Acquired syphilis of the tympanum
V. Acquired syphilis of the labyrinth
VI. Congenital syphilis of the external outer and middle ear
VII. Congenital syphilis of the labyrinth

PAGE

HEREDITARY SYPHILIS 603

By F. R. STURGIS, M. D.,
Visiting Surgeon to the Third Venereal Division, City Hospital, Blackwell's Island, New York.

History 603
Etiology 604
Bacteriology of hereditary syphilis 630
Mortality of syphilitic infants 631
Date of appearance of symptoms in inherited syphilis 632
Lesions of the skin in inherited syphilis 637
Affections of the mucous membrane 643
Affections of the lymphatics and glands 645
Affections of the nails 647
Alopecia 648
Affections of the genital organs 648
Diagnosis, prognosis, and treatment of hereditary syphilis 650

DIAGNOSIS AND PROGNOSIS OF SYPHILIS 661

By HERMANN G. KLOTZ, M. D.,
Consulting Surgeon to the German Hospital, New York.

Difficulties of diagnosis 664
Means and rules of diagnosis 667
Ethics of diagnosis 682
Prognosis 686
Value of statistics 687
Change in the character of syphilis 688

THE TREATMENT OF SYPHILIS 709

By J. WILLIAM WHITE, A. M., M. D.,
Professor of Clinical Surgery in the University of Pennsylvania, and Surgeon to the University, German, and Philadelphia Hospitals.

Legislation in relation to syphilis 709
Prophylactic treatment 714
Abortive treatment 715
Excision of the chancre 720
Constitutional treatment 725
The modified "expectant" plan of treatment 727
The continuous treatment of syphilis 728
The interrupted treatment of syphilis 730
Systematic treatment 732
Hygienic measures 740
The toxic effects of mercury—hydrargyrism 742
The toxic effects of the iodides—iodism 746
The methods of administering mercury 749
1. By the mouth 749
2. Inunctions 753
3. Hypodermatic injections 759
The soluble salts used hypodermatically 762
The insoluble salts used hypodermatically 767
4. Vaporization 784
5. Mercurial and thermal baths—heat 785
The use of the iodides in syphilis 792
The local treatment of syphilis 801
The treatment of hereditary syphilis 807

SYPHILIS IN RELATION TO PUBLIC HEALTH

By SAMUEL TREAT ARMSTRONG, M. D., PH. D.,
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United States Marine Hospital Service; Chairman Section on Pu
New York Academy of Medicine, etc.

- Statistics of general hospitals
- Statistics of the United States Marine Hospital Service
- Statistics of the United States Army
- Statistics of the United States Navy
- Statistics of European and native army of India
- Mortality statistics of syphilis in England
- The socio-economic relations of syphilis
- Influence of syphilis on health and longevity
- Relations to life insurance
- Syphilis insontium
- Relation of syphilis to marriage
- Demographic relations of syphilis
- Prostitution and syphilis
- The regulation of prostitution
- The Contagious Diseases Acts
- Other measures to limit the spread of syphilis

CHANCROID AND ITS COMPLICATIONS

CHANCROID

By EDWARD MARTIN, A. M., M. D.,
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- Etiology
- The clinical features of chancroid
  - The mixed chancre
- The complications of chancroid
  - Lymphangitis
  - Bubo, or lymphadenitis
  - Phimosis and paraphimosis
  - Phagedena
- Treatment of chancroid and its complications
  - Treatment of chancroid
  - Operations
  - The treatment of chancroidal buboes
- Condylomata acuminata

CHANCROID OF THE ANUS AND RECTUM

By JAMES P. TUTTLE, M. D.
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Anus, New York Polyclinic.

- Peri-anal chancroids
- Anal chancroids
- Rectal chancroids
- Phagedenic chancroids
- Complications

LIST OF ILLUSTRATIONS.

PHOTOGRAPHS IN COLORS AND CHROMOLITHOGRAPHS.

PLATE
II.—Chancre of lip, with macular syphilide.
III.—Maculo-papular syphilide.
IV.—Miliary papular syphilide.
VI.—Circinate syphilide of face.
XII.—Rupial syphilide.
XVIII.—Syphilis of the tongue.
XXI.—Syphilis of the eye and its appendages.
XXII.—Syphilis of the eye and its appendages.
XXIII.—Syphilis of the eye and its appendages.
XXIV.—Chancroid and its complications.

HISTORY, GEOGRAPHICAL DISTRIBUTION, EVOLUTION, AND GENERAL PATHOLOGICAL ANATOMY OF SYPHILIS.

PAGE
Plate I.—Portions of a skeleton from a burial ground in Colorado . *Frontispiece*
Fig. 1.—Tibiæ of a skeleton from a prehistorical burial site 2
Fig. 2.—Section of tibia exhumed from a prehistoric burial site 3

SYPHILIS OF THE SKIN—SYPHILODERMA.

Plate II.—Chancre of the lip with macular syphilide (colored) . . . Facing 146
Plate III.—Maculo-papular syphilide (colored) . . . . " 150
Fig. 1.—Anatomy of the syphilitic macule 149
Fig. 2.—Anatomy of the syphilitic papule 153
Plate IV.—Miliary papular syphilide (colored) . . . . Facing 155
Plate V.—Lenticular papular syphilide. . . . . " 157
Plate VI.—Circinate syphilide (colored) . . . . " 158
Plate VII.—Papulo-squamous syphilide . . . . " 160
Plate VIII.—Large papulo-squamous syphilide . . . . " 162
Fig. 3.—Anatomy of the broad condyloma 167
Plate IX.—Papulo-pustular syphilide . . . . Facing 169
Fig. 4.—Anatomy of the syphilitic pustule 171
Plate X.—Acne-form, impetigo-form, and ecthyma-form syphilide . . Facing 176
Plate XI.—Pustulo-crutaceous syphilide . . . . " 178
Fig. 5.—Anatomy of deep-seated ecthymatous pustule 179
Fig. 6.—Same. shown under higher power 180

Plate XII.—Rupial syphilide (colored) . . . .
Fig. 7.—Impetigo rodens . . . .
Fig. 8.—Ecthyma-form ulcer . . . .
Plate XIII.—Disseminated tubercular syphilide . . . . . .
Plate XIV.—Grouped tubercular syphilide . . . .
Fig. 9.—Tertiary ulceration of the nose . . . .
Fig. 10.—Anatomy of the tubercular syphilide . . . . . .
Plate XV.—Gummatous ulceration of the leg (photogravure) . .
Fig. 11.—Anatomy of the gumma . . . .
Plate XVI.—Superficial serpiginous syphilide . . . . . .
Plate XVII.—Deep serpiginous syphilide . . . .

SYPHILIS OF THE MUCOUS MEMBRANES.

Plate XVIII (colored) . . . .
  Fig. 1.—Ulcerating and nonulcerating gummata of tongue.
  Fig. 2.—Fissure of tongue four months after infection.
  Fig. 3.—Nonspecific leucokeratosis.
  Fig. 4.—Syphilitic leucokeratosis.
  Fig. 5.—Exfoliatio areata linguæ.
  Fig. 6.—Papulo-erosive plaques of tongue.
  Fig. 7.—Benign ringworm, under surface of infant's tongue.

SYPHILITIC AFFECTIONS OF THE BONES.

Fig. 1.—Gumma of medullary canal . . . .
Fig. 2.—Gummata of skull (hereditary) . . . .
Fig. 3.—Exostosis of tibia (acquired) . . . .
Fig. 4.—Destruction of external and internal tables of skull (acquired) .
Fig. 5.—Destruction of internal table . . . .
Fig. 6.—Superficial destruction of portions of the bones of the skull and fa
Fig. 7.—Exostosis of skull (hereditary) . . . .
Fig. 8.—Destruction of nasal bones (acquired) . . . .
Fig. 9.—Exostosis of lower and right humerus (hereditary) . . . .
Fig. 10.—Hyperostosis of left tibia, exostosis of right (hereditary) . .
Fig. 11.—Exostoses of tibiæ (hereditary) . . . .
Fig. 13.—Rachitic tibia . . . .
Plate XIX.—Facies of hereditary syphilis . . . .
Fig. 14.—Syphilitic dactylitis (inherited) . . . .
Fig. 15.—Syphilitic dactylitis (acquired) . . . .
Fig. 16.—Syphilitic dactylitis, showing loss of tissue and shortening of fing
Fig. 17.—Syphilitic dactylitis (inherited) . . . .
Fig. 18.—Syphilitic dactylitis (acquired) . . . .
Fig. 19.—Syphilitic dactylitis (acquired) . . . .
Fig. 20.—Tuberculous dactylitis . . . .

SYPHILIS OF THE UPPER AIR-PASSAGES.—THE NOSE, PHARYNX, LA
TRACHEA, AND BRONCHI.

Fig. 1.—Syphilitic fibroid degeneration of middle and inferior turbinated bo
Fig. 2.—Destruction of nose and upper lip (tertiary syphilis) . . .
Fig. 3.—Effect of tertiary ulceration of the nose (acquired syphilis) . .
Fig. 4.—Deformity of the nose (inherited syphilis) . . . . .
Fig. 5.—Tertiary syphilitic stenosis of the larynx . . . . .
Fig. 6.—Excentric stricture of the trachea (inherited) . . . . .

SYPHILIS OF THE VISCERA.

PAGE
Fig. 1.—Syphilis of the placenta 372
Fig. 2.—Syphilitic endarteritis of a small central artery 382
Fig. 3.—Small gumma of the lung 390
Fig. 4.—Diffuse interstitial syphilitic pneumonia. 392
Fig. 5.—Syphilis of the lung 394
Fig. 6.—Syphilis of the lung—early changes in the bronchi 395
Fig. 7.—Syphilis of the liver 409

SYPHILIS OF THE NERVOUS SYSTEM.

Fig. 1.—Ocular palsy 491
Fig. 2.—Ocular palsy 492
Plate XX. . . . . Facing 518
  Fig. 1.—Gummatous infiltration of ventral portion.
  Fig. 2.—Thickening of the pia and small-celled infiltration of medulla.
  Fig. 3.—Same, with higher power, showing also typical endarteritis.
  Fig. 4.—Leptomeningitis specifica and infiltration of substance of cord.
  Fig. 5.—Same, under higher power, thickening of pia, etc.

SYPHILIS OF THE EYE AND ITS APPENDAGES.

Plate XXI (colored). . . . . Facing 538
  Fig. 1.—Gummata of the conjunctiva.
  Fig. 2.—Scleritis gummosa.
  Fig. 3.—Interstitial keratitis.
  Fig. 4.—Interstitial keratitis.
  Fig. 5.—Plastic syphilitic iritis.
  Fig. 6.—Plastic iritis, with posterior synechiæ.
  Fig. 7.—Gumma of the iris.
Plate XXII (colored) . . . . Facing 573
  Fig. 1.—Choroiditis areolaris disseminata.
  Fig. 2.—Choroiditis areolaris disseminata and choroiditis centralis.
  Fig. 3.—Neuro-retinitis.
  Fig. 4.—Neuro-retinitis with hæmorrhage.
Plate XXIII (colored) . . . . Facing 574
  Fig. 1.—Papillitis of optic nerve—choked disk.
  Fig. 2.—Atrophy of the optic nerve.
  Fig. 3.—Syphilitic retinitis.
Two figures.—Syphilitic teeth 577

SYPHILIS IN RELATION TO GENERAL HEALTH.

Fig. 1.—Diagram showing the annual percentage of syphilis in the three categories of Parisian prostitutes 841
Fig. 2.—Proportion of syphilitic in St. Petersburg prostitutes, arranged according to quinquennial age periods 843

CHANCROID.

Plate XXIV (colored) . . . . Facing 852
  Fig. 1.—Chancroid in process of healing—suppurative bubo.
  Fig. 2.—Gangrenous chancroid in negro: destruction of greater part of glans penis, and of cavernous bodies.
  Fig. 3.—Sloughing chancroid in mulatto.

HISTORY, GEOGRAPHICAL DISTRIBUTION, EVOLUTION, AND GENERAL PATHOLOGICAL ANATOMY OF SYPHILIS.

By JAMES NEVINS HYDE, M. D.

Definition.—**Syphilis.**—Synonyms: Lues venerea; morbus gallicus; pox; bad disorder; Fr., *vérole;* Ital., *sifilide;* Ger., *Lustseuche; Krankheit der Franzosen;* Span., *sifilis;* Swed., *radezyge.*

Syphilis is a general infectious disorder, both acquired and transmissible by inheritance, chronic in course, and displaying in a determinate order specific symptoms which may be declared in one organ of the body or simultaneously or successively in several. It is to be classed with the infectious granulomata, being due to the toxic effect of the invasion of the tissues of the body by micro-organisms whose identity and relations have not yet been established as in other affections of the same class, such as tuberculosis, lepra, and mycosis fungoides.

The name by which the disease is most often recognized in all languages was first employed by Hieronymus Fracastorius, who in the year 1521 composed a poem in which a herdsman named Syphilus was afflicted with some mysterious malady by the god Apollo, for giving divine honors to the king. The derivation of the word from the Greek σῦς and φίλος was evidently intended by the author to suggest, in no reproachful sense, that the hero of his verse was a simple companion of swine.

HISTORY.

The existence of syphilis in prehistoric ages has been inferred after close study of certain bones exhumed in various parts of the earth, and which exhibit lesions identical with or similar to those recognized in bones where there is no question as to the syphilitic nature of the process. Thus in Solutré, of the department of Saône et Loire, in Peru, Ecuador, Tennessee, Colorado, California, Lima, and other places, bones have been exhumed exhibiting exostoses, and the results of periostitis, osteitis, sclerosis, caries, and other morbid processes. These lesions have been interpreted by Parrot and others as unequivocally due to syphilis; and from proofs of this character the prehistoric existence of the disease has been considered established.

Other views, however, have been taken of this subject, and that by those who have studied with special attention bones exhumed from places supposed to have been the site of prehistoric sepulture, where osseous lesions of the kind named above were both numerous and in a high de-

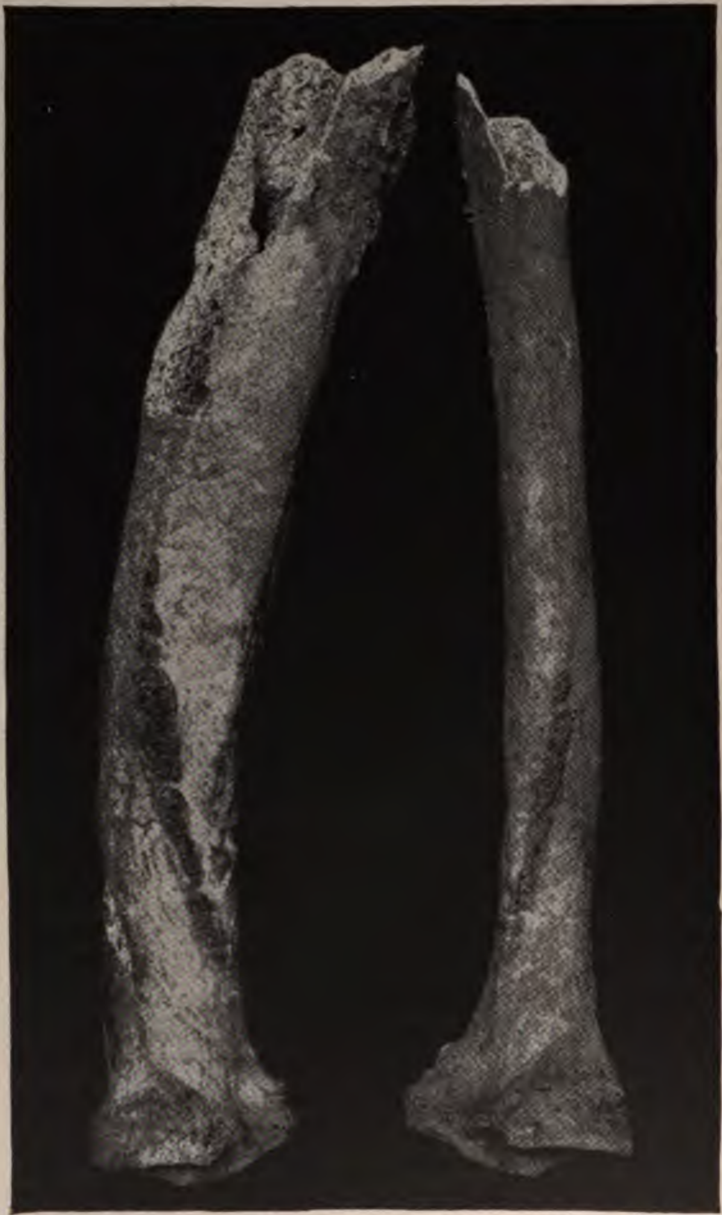

FIG. 1.—Tibiæ of a skeleton exhumed from a prehistoric burial-site on the Animas River, Colorado. (From a photograph of bones in the author's collection.)

gree deforming. Rigidly careful exclusion from these of the nodules to be recognized in bones certainly syphilitic, exhibiting laminated or eburnated, smooth or flattish, and distinctly circumscribed swellings; the noticeable absence in them of certain characteristic annular swellings at one extremity of several long bones such as the radius; and the absence of bone cicatrices, "splints," unmistakable diffuse or circumscribed gummatous changes; and even of a thoroughly characteristic "worm-eaten"

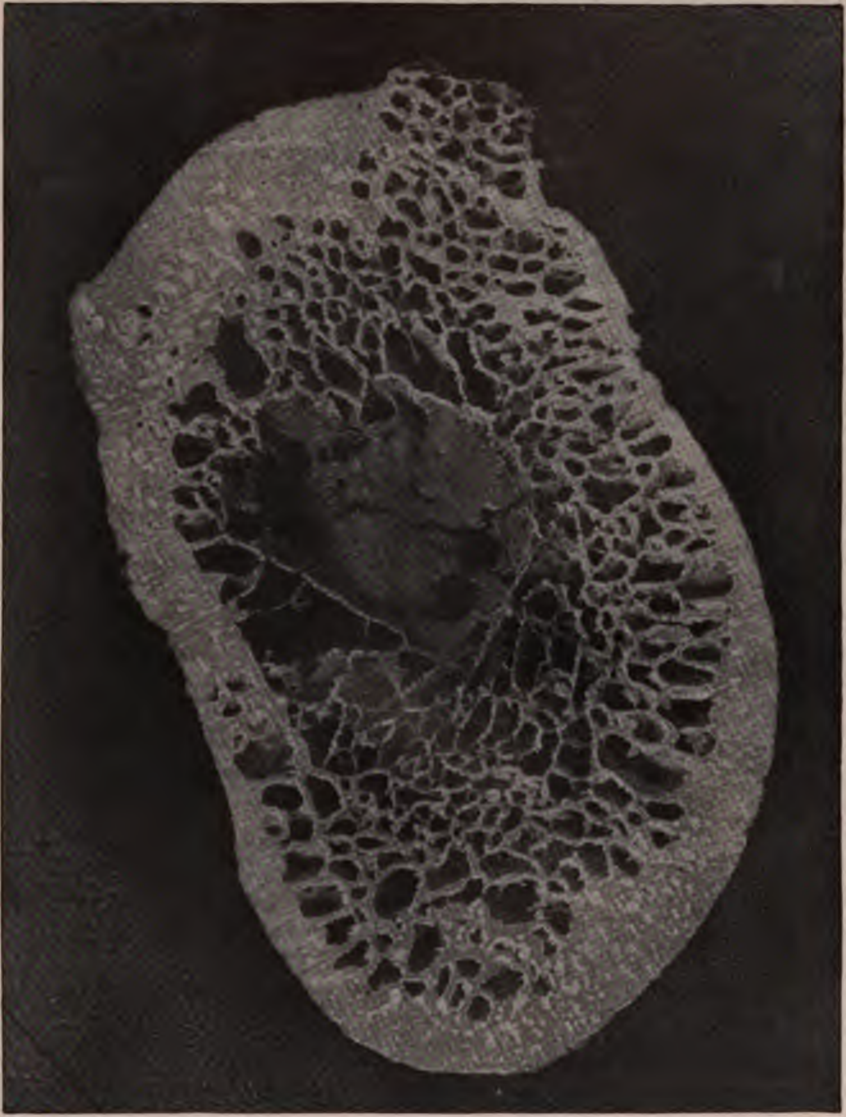

FIG. 2.—Section of tibia exhumed from a prehistoric burial-site in Colorado. (The author's collection.)

structure, suggested grave doubt. Should not the bones of
race, where no efficient treatment interposed a barrier ag
croachments of the disease, exhibit in an intense degree, if s
had prevailed when that race yet survived, the osseous lesion
It is almost true that the reverse is the rule. Would not a
in the latter part of the Pleistocene period, in their rude effo
and overcome the perils of climate and of enemies, be sub
fluences that might determine in them osseous inflammatio
bones with results that resembled to-day those of other d
establish a denial to these questions would be difficult. Sec
of these bones, and a careful study of the microscopical ch
made evident, suggest that the changes induced might have
by simple inflammation. In one such bone examined for th
Dr. Prudden, of New York, the result was by no means in
specific process. The section examined was of a left tibia
age, exceedingly light in weight, with characteristic anterio
great increase in thickness (Fig. 2). It had been sent to the
Colorado, where it had been exhumed from a burial-place
by several experts to be a prehistoric site. But here were f
irregularity of grouping of the bone-cells and lamellæ, som
pressions, and lacunæ indicating formation and absorption of
the influence of a chronic periostitis. There was no morph
dence sufficient to justify the belief that the individual h
victim of syphilis; and yet, without any question whateve
was an unusually good example of the class whose conspicuous
have induced a number of distinguished writers to assert t
had a prehistoric origin.

Again, the exhumation of bones found in places of
ancient sepulture is far from demonstrating a prehistoric e
such osseous relics. The enormous possibilities of error in t
establish a prehistoric existence of the mortuary remains of a
to be fully weighed in connection with the possibilities of wh
intrusive interment, the latter occurring at a much later perio
assigned for the first acts of sepulture in any given cave, o
cliff-side. Even the discovery of bones beneath strata of roc
vium demonstrably of a period near the Pleistocene, has bee
be explicable by the shifting of soil and the accidents of natu
sion occurring at later dates. The conditions of a rigid demo
the prehistoric existence of a skeleton or any part of one sup
syphilitic, are in fact scarcely to be fulfilled in any one case.
question requires not merely a satisfactory proof of the pre
istence of the bone and of a prehistoric sepulture, but also pr
violation of the resting-place later by intrusive interment, and

satisfactory demonstration of a syphilitic agency in the osseous changes. The problem to be solved also demands absolutely the discovery of bones indicating inherited syphilis. Many bones of children supposed to be historic are to be found in American collections with unquestioned changes due to osteitis and periostitis, but none, so far as known to the writer, can be with positiveness assigned to the category of bones changed by inherited lues. *Per contra*, it should be added, that there are several skulls of children in the Anthropological Institute of France supposed to be prehistoric, in which Parrot, Broca, and other French writers positively assert that the changes produced are the result of inherited syphilis; other bones of the skeleton, both in the museum named and in others in France, exhibit lesions interpreted as luetic by careful observers qualified to give judgment. Unfortunately for the student of this subject who must review the literature of foreign authors, most contributions to this theme made by physicians are arguments on the one side or the other of the syphilitic or nonsyphilitic character of symptoms in bones of "great antiquity," the proof of a prehistoric existence of such bones being ignored in well-nigh every case. Thus, in his admirable chapter devoted to this subject, Jullien writes of the famous Ducrot skeleton that it belonged "in great probability to the epoch of primitive man"; while Buret scarcely takes the pains to set forth, in his exhaustive discussion of the same theme, the stern necessity of establishing for every bone having the appearance of syphilitic changes and also of great antiquity, its prehistoric age as conditioned upon its essential characters, the antiquity of its burial site, and the proof of nonintrusion. The whole should be irrefragable.

Considering the disease as it has prevailed within historic periods, a serious doubt has arisen respecting its existence and recognition prior to the close of the fifteenth century, a crisis in the career of syphilis to which attention is directed later in these pages. This doubt has been suggested by the fact that the several disorders of venereal origin now recognized as essentially distinct each from the other, were inextricably confused till within a relatively recent date. Even so modern a writer, for example, as John Hunter, in the year 1786, was not clear in distinguishing between the gonorrhœal and syphilitic virus. Had this simple distinction been indeed established, the no less important separation of the contagious, venereal, nonsyphilitic, pustulo-ulcerative lesion (chancroid, non-infecting, soft, or simple chancre; *chancre mou*, *chancrelle;* Einfacher Schanker, weiche Schanker, etc.) from both the initial sclerosis and later genital lesions of systemic syphilis, was far from complete at the beginning of the present century. Of comparatively recent acquisition, too, is a knowledge of the fact, now well recognized, that in persons addicted to promiscuous sexual relations, venereal warts, not of necessity due either to syphilitic or blennorrhagic antecedents, may be confounded with symptoms of those diseases.

This confusion in a field where careful clinical observation is now daily discriminating with results of enormous value, is to be coupled with an important fact. The utmost looseness has prevailed in the use of terms as applied to lesions of the genital organs of both sexes, not merely by the writers of antiquity on medical subjects, but also by secular historians and poets of a similar age, whether contributing to serious, licentious, or sarcastic literature. In point of fact, as employed by the fathers of medicine, the names which still survive in the modern nomenclature of diseases in general rarely possess to-day the precise significance of their earlier usage. Lastly, it is to be remembered that for many of the scanty facts gleaned from documents dating more than one thousand years before the Christian era, medicine is indebted to translations of the written tongues of Asiatic peoples no longer employed as vernacular, the translators in most cases being men learned in other fields than in the science of medicine.

This much it is needful to premise in order to be able to accept or reject with due caution, on the one hand, the specious pleadings by which numerous authors have demonstrated to their own satisfaction that syphilis in every one of its recognized manifestations was well known to the ancients; and the claim, on the other hand, enforced by writers of no less erudition, that the disease was first made known after the discovery of the New World.

In the ancient literature of the Chinese and Japanese, according to Buret and other French writers who have expended great labor in the investigation, not only were the initial lesion of the disease, its cutaneous, osseous, and visceral manifestations, understood and appreciated, but by the Chinese at least the value of mercury as a therapeutic agent was fully recognized. Paragraphs are quoted from a Chinese treatise entitled Hoang-ty-mi-king, in which laryngeal symptoms, osteocopic pains, and condylomata, are described with such minuteness as to lead to a suspicion of the genuineness of the text. In certain Japanese manuscripts, to which a much less remote date is assigned, there are similar references, with phrases, indicating that at the time of its writing the destructive action of syphilis upon the nose, the ears, and the joints was fully recognized.

Similarly it is claimed that certain of the Egyptian papyri and cuneiform inscriptions from Assyria and Babylon, found in the collections of scientific societies, indicate clearly that, by the people living at the time these records were made, some relation was established between local genital disease resulting from sexual indulgence and lesions observed later upon the trunk, the limbs, and the organs of sense.

In the records and traditions of the Hebrews, embodied for the most part in their sacred writings, a field is presented where the ripest scholarship and the most painstaking study have put forth their finest effort. Here the most earnest attempts have been made to demonstrate the existence of syphilis among the descendants of Abraham; and of these efforts it may be said that if the proofs of the existence of syphilis among the Chinese and Babylonians have no better basis than those adduced for the dwellers in Judea, the end in view is far from attainment.

There is strong reason to believe that reference is made to gonorrhœa in the regulations prescribed by the Levitical law; but that syphilis is to be recognized in the vague phrases adduced in proof of its existence among the Hebrews, involves a looseness of conjecture which would be fatal to the accuracy of a modern diagnostician. Neither in their sacred writings nor in the commentary of Josephus, nor in the Talmudical books, are there unequivocal sentences bearing on this point. In the interpretation, moreover, of the passages cited as a basis of the claim put forth, it should not be forgotten that in these poetical and prophetical books the language employed is that of an Oriental people, often figurative in the extreme, or the passionate phrases of varying emotions not to be measured by the cold terms of scientific inquiry. Thus, the strong expressions in which David, after the loss of his child by Bath-sheba, bewails the disease of his bones, the loss of his strength, and the cleaving of his tongue to his palate, have been urged in proof of a syphilis derived from the woman and the cause by inheritance of the premature death of the child; but those who have most strenuously enlarged upon this theme have neglected to explain how this union resulted later in the birth of four sturdy sons in the royal palace, the eldest of whom, Solomon, proved to be one of the greatest of the royal line of Judah.

Examined with a cautious exclusion of vague expressions, one turns with the same result to the passages from the ancient records of India, known as the Vedas, which are cited in proof of the existence of syphilis among the people who first listened to these historical and religious poems and precepts. It is to be remembered that they, equally with the dwellers in the land of Judea, were for climatic and geographical reasons made only too familiar with a series of disorders whose manifestations, in the hyperbole of the Orient, could readily be interpreted by modern investigators as descriptive of syphilitic symptoms. Thus they were in unquestioned contact with lepra, and were peculiarly subject to the ophthalmias and other ocular diseases so common in the East. There is reason to believe that they were afflicted with psoriasis, scabies, and tuberculosis. They evidently suffered from hæmorrhoids, fissures of the anus, and vegetations due to the bathing of the genital parts in venereal secretions. The eczemas of a modern date are probably identical with some of the pruritic affections described as originating in the sexual act. That the

language used does not certainly apply to the manifestation
is evident from the fact that the symptoms described are i
referred to the sexual act after long continence, and even
cesses pure and simple.

Passing in review the several nations of antiquity wh
torical literature, one can distinguish in each traces of ver
with symptoms described that might be those of syphilis, an
as has been already shown, be referred to nonsyphilitic ve
festations. Among the Greeks, the license of whose mann
permitted the largest opportunities for the spread of sex
there is wanting any specific description of a causal relation b
tal lesions and constitutional troubles. Among them, as an
cient Romans, the literature of ancient medicine abounds wit
references to "growths" (φύματα), fig-like (σῦκα), warty
fungous elevations, and ulcers; but the sclerosis of primary
ease is not represented by any term that survives. It is in
worthy fact, that while in the nomenclature of modern path
prisingly large list survives of names many of which with
application still relate to morbid appearances at least cognate
originally pointed out by such terms, there is scarcely one
pages of syphilography. Thus, "anthrax," "carbuncle," "
"keloid," "mellitagra," and other names, still point with n
clearness to the affections they first designated, while the term
itself is a corruption of a word originally employed to designa
different lesion.

Divorce among the ancient Greeks was regulated by specia
of law; and though it is to be admitted that these separation
frequent, it is certain that they were at times the result of triv
Thus we find husbands separated from wives because the chil
ing from the union were all of one sex, or too numerous, or
sent. Divorce for infidelity was also possible, though the
power to the husband finding a wife in the adulterous act w
recourse to the courts scarcely needful. But it is a very st
that there is no provision in the Athenian laws for divorce on
of contracting a venereal disease; and the same is true of Spar

On the other hand, passages are cited from the writings of
des, Erasistratus, Dion Chrysostom, and others, in which it ap
a raucous voice, a flattened nose, ulcerations of the legs, and
other parts of the body, such as the hands and feet, were rec
the results of venereal contagion, whether in the sexual act
unnatural practices, which have left a sinister bar of black
historical page of almost every nation worshiping false gods
Christian era.

The literature of ancient Rome, whether of serious or sarcastic intent, conveys neither more nor less proof of the existence of syphilis at that period than does that of Greece. There are abundant proofs of the existence of venereal disease. Here, too, the fig-like vegetations (*ficus*), the fungous growths, and genital excrescences, are often mentioned. In the pages of other authors exist references to symptoms apparently due to systemic disorder which seem to indicate that the constitutional effects of disease incurred in the practices of debauchery were not unknown. Such are the phrases referring to cutaneous blotches, lesions of the mouth, tumors of the legs, and discolorations of the eyes and orbital regions, all of which, as shown before, might be explained by the existence among them of scabies, ecthyma, psoriasis, and other affections of the skin.

In the middle ages, the traces, if any exist, of a syphilis before the close of the fifteenth century are, like those preceding, vague. From Lanfranc, of Milan, to Peter Martyr there appear, in the pages of medicine and history isolated sentences which describe syphilis not more clearly and not less distinctly than the records of an earlier epoch. Thus we find lucidly indicated genital sores followed by sloughing, originally resulting from contagion. In an oft-quoted sentence from the pages of the Glossulæ Geraudi, whose date is uncertain, it is distinctly stated that the "whole body" may be infected as the result of lesions of the male organ infected from the humors of the foul uterus. On the other hand, Lancereaux points to the evidences in the pages of Gordon, Schoff, Michael Scotus, and others, that syphilis (or the disease supposed to-day to have been identical with it) was confused with lepra by both lay and medical authors.

Reviewing the entire subject of the history of syphilis from the earliest records to the close of the fifteenth century, one is not justified in considering its existence at that period verified and the chain of its consecutive phenomena even partially established. There are enormous opportunities for error on the part of those who have championed either side of the question. Vague terms have been given a meaning unquestionably not originally included in their sense; others have been actually twisted from the designation of one symptom to that of another.

On the other hand, the mass of testimony is sufficient in itself to bear some weight. Local venereal disease of contagious character and formidable symptoms was known. It appears that, in a general way, systemic consequences of debauchery were also recognized. If syphilis then actually existed, it is probable that it had not yet attained among men the virulence and formidable features of a later date. If it actually did exist, the idea of its unity in both local and general expressions had not been grasped; and assuredly had not been exactly differentiated from several other affections.

In the year 1492 the admiral Cristoval Colon, bette Americans as Christopher Columbus, sailed across the Atla covered some of the outlying islands of the Western hem the 4th of January, 1493, he sailed from the West Indies on Spain, which was reached by the following March. Ruy D physician of Andalusia, stated that he treated some of this syphilis, the symptoms of which first appeared on shipboard landing. On the 14th of June of the year following, Nichol reported an epidemic of syphilis. Soon after this the Gr Gonzalez Fernandez de Cordova, left Spain for Italy, where campaign his troops were brought into contact with those of

The French troops were those of the monarch Charles V an expedition against Naples led an army of between eight a sand men into the plains of Italy, crossing into Piedmont on December, 1494. This army was officered by men of arist nections leading the loosest of lives. The rank and file, fo example of their dissolute commanders, were successively q most of the larger Italian cities, and in the license of unrestr hesitate even to pillage Rome.

For the first time in the history of the world syphilis w vealed in completeness to the study of medical men. An u epidemic of the disease at once spread with greater or less ra France, Spain, Italy, Switzerland, and the Rhine provinces, tending to other parts of Europe. Its phenomena were no explored, and its primary lesions connected distinctly with i manifestations. It was given names in almost every land that that nation from which each supposed that it had been derived stated that the disease had been brought from the West Ind fleet of Columbus, and added that he was personally acqua some of the navigators, giving their names, who had been infe natives of the New World. He further reported that infecte were known to have traveled into Italy with the army of Syphilis went accordingly by the name of "the American disea French disease" (*morbus gallicus*), "the Italian disease," "the the Neapolitans," "of the Christians," "of the Turks," "of t guese," "of the Germans," "of the Persians," "of the Poles." every tongue of Europe, however, there is some title of antiqu would fasten the origin of the disease upon the French.

Two views are taken of the apparent origin of this diso called by its legion of new names at the close of the fifteenth One explains the first epidemic of Europe by an absolutely origin, a deportation of the germ from the West Indies after th bian discoveries, and an extension thereafter in consequence of ties afforded by the commingling of nations in the campaigns of the military leaders already described. The other, basing conclusions upon the traces of its existence in the preceding centuries of history, which have been already reviewed in these pages, takes the ground that the epidemic succeeding the Columbian discovery, was merely an awakening to activity of the germs of a disease which had been up to that date unnoticed because of its limitations.

Here, too, an absolute conclusion can not be reached. The evidences of a prehistoric syphilis in America, though fortified by the researches of the eminent Prof. Joseph Jones, of Louisiana, Dr. Gustavus Bruehl, of Ohio, and others, can not be accepted without reserve. The objections to many of the osseous specimens to be found in American collections of bones have been recounted in connection with the general subject, and hold good for all relics taken from places of presumed prehistoric sepulture. The historic evidences of syphilis among the crowded islands of the newly discovered hemisphere are as significant and authentic as the proofs of the same disease among the Egyptians, the Chinese, and the Greeks. The writings of Sahagun, Torquemada, Roman, Mendieta, Pane, and others, show that the bodies of the Indians dead of syphilis were interred as distinguished from those dying of other disorders, which were cremated; that the infected were not deemed worthy of religious sacrifices; that they were not represented at the festivals; and that the disease itself was counted as a punishment sent from the gods for the non-performance of religious rites, and other offenses. According to Bruehl, the Mexicans not only recognized the relation between the primary and consecutive manifestations of the malady, but distinguished between its several types, and were so well acquainted with its management that they taught the Spaniards how to treat it, even advising recourse to thermal resorts for the purpose. While there were seventeen Indian dialects, each of which had a primitive native term for the designation of the disease, none of these seems to have crossed the ocean to relieve the French of the odium of begetting a shameful disorder to which their name had been given by the consent of all Europe. None of these Indian names, however, was, when examined by experts in their language, found to betray in the least, evidences of a recent coining; though many such terms were required and actually coined after coming into contact with the Spanish race on their native soil. In the Mexican language of the sixteenth century there is a remarkable confusion of the several words employed to express power, divinity, and syphilis—a fact which is also to be noted in the dialects of Quechua and Aymerás, three hundred years before Pizarro conquered the capital of the Incas. Certainly, whether the syphilis of Europe had or had not an American origin, the proofs of its existence among the natives of the New World before the first voyage of

Columbus are as strong as any derived from a study of the papyri of Egypt or the famous documents which Captain Dabry brought to light from the heart of Asia.

The history of syphilis, from the beginning of the sixteenth century to the present date, is comparable with that of the advance in the same period of all science. Obscured at times by reason of its confusion with astrology and the arts of charlatanism, the evolution and symptoms of the disease were soon studied by Paracelsus (1536), and later by Della Croce and Ambroise Paré. Astruc and Van Swieten, in the early part of the eighteenth century, systematized the employment of mercury in the management of the disease; and were followed by the distinguished Boerhaave, who in his immortal Aphorisms gave to the world the fruits of his patient study and keen analysis of the several pictures presented in the course of the disorder.

Toward the close of the same century, John Hunter and Benjamin Bell, both Englishmen, contributed by original investigation to a further knowledge of the same theme. Gradually the truth dawned that blennorrhagic affections were to be eliminated from the lesions of syphilis, and that a man with a purulent urethral discharge might have a syphilitic sore, intra-urethral in site, which might render the secretion of his apparently simple gonorrhœa a vehicle for the transmission of a more serious virus. Hunter's name still lingers upon the lips of the practitioners of a former generation, in the phrase "Hunterian chancre," applied to a clinical form of the initial sclerosis large of induration with a centrally situated crateriform excavation.

With the nineteenth century began the rapid acquisition of knowledge on the subject of syphilis, whose results to-day furnish a mass of literature of incredible bulk, and a list of investigators and authors whose eminence has contributed luster to the records of medicine in every nation.

The French were, without question, earliest to win a name in this fruitful field. Jourdan and Desruelles were merely the *avant couriers* of the eminent Ricord, whose obsequies were happily not celebrated till after the International Congress of Dermatology and Syphilography of 1889 had greeted with acclamations the form of the great teacher by the side of its honored president. He it was who first comprehended, and later taught in a masterly manner, the distinctions of three great periods in the disease—the so-called primary, secondary, and tertiary—phrases now recognized as convenient forms of expression, but marking, at the time when they were first given to the scientific world, an epoch of transition in the knowledge of the phenomena of syphilis. They will survive on the lips of the laity for many years to come, as historical evidences of the value of careful observation of all morbid phenomena. To his worthy successor, Bassereau, is due the credit of initiating the movement which at one time completely separated, in the minds of advanced students, the simple noninfecting from the syphilitic chancre, his work being speedily followed by that of Rollet, whose explanation of the "mixed" chancre relieved many doubtful cases of the burden of a danger equally great to both patient and physician.

Then follows a long list of names in France, Germany, and England, whose numerous works can scarcely receive mention in the limits of a chapter like the present. Lancereaux, Diday, Mauriac, Parrot, Jullien, and Mireur have in our day made contributions in France that were fitly crowned with the great work of Fournier, who to-day represents among his colleagues the fine fruit of more than a quarter of a century of patient observation and study of the effects of the disease. His contributions to the special subjects of nervous and inherited syphilis would alone serve as a basis for his claims to eminence. In Italy, Profeta, Pellizari, and Gamberini; in Germany, Virchow, Heubner, Erb, Oppolzer, Auspitz, and more recently Kaposi, have been in England represented by Lane, Hughlings Jackson, and Jonathan Hutchinson, by Haslund in Denmark, and by Boeck in Sweden.

In the United States of America the first author to command the general attention of the profession was Freeman J. Bumstead, whose work on The Pathology and Treatment of Venereal Diseases, published in Philadelphia in 1859, was the noteworthy predecessor of a list of contributions to the subject by American writers, the value of whose observations have not been surpassed in any country, and are now recognized in all. Among those who have followed him may be named Taylor, Keyes, Morrow, and Sturgis, of New York; Greenough and Post, of Boston; J. William White, of Philadelphia; and many of the dermatologists of this country, such as Duhring, Robinson, Piffard, and others, who, describing chiefly the cutaneous lesions of the disease, have devoted chapters in their treatises to the consideration of this special part of syphilography. In most of the medical schools of this country to-day the subject is taught with a clearness and illustrated with a fullness never before made available to the American student of medicine. By the aid of the several atlases of American authorship, notably those of Taylor and Morrow in chromolithographs, and of George Henry Fox in photographs, the illustration on paper of the ravages of the disease has been accessible to the practitioner, outside of the amphitheatre of the medical college. Of the pathological work done by Lustgarten, of New York, and others, the reader has an opportunity of judging in the pages which follow.

GEOGRAPHICAL DISTRIBUTION OF SYPHILIS.

The interest once centered in the questions relating to t ical distribution of syphilis has been practically set aside l knowledge had to-day respecting the different phenomena of and the advancement of international communication in the extension of commerce by steam power on sea and land. nary cycles of the disease are relatively rapid of completion infected individual can compass the globe between the date dent and the onset of general symptoms; and, when sufferi latter in a contagious form, can make the same wide circuit contagious lesions are made to disappear. It follows that i part of the nineteenth century there is no corner of any civil where the disease may not be encountered; and if there be ized people as yet relatively free from its influences, it is lar that people have not been in intimate commercial relations wi at large. Directly on the establishment of such relations, ev moter districts of the globe, syphilis is wont to appear, and f spread with unusual severity.

For countries such as Iceland, and for certain islands in St. Lawrence, it is claimed there is special immunity against since in these and other places after its introduction it scarcel second generation. This fact, supported by the statements of servers, is readily explicable because of the simple lives and m ior of the people gathered in these rustic communities. T nothing at all surprising in these statistics, is daily demonstr experience of many of the smaller towns and villages of th where, though syphilis has been at one time or another act duced, practitioners can report that they are not in these fronted with a single case of the disease in the course of year vation. No one to-day attributes this immunity to the co either climate or soil. It is an immunity due to the simple fa infected, after communicating the disease to a few persons, treated, have lost the power of further transmission, and hav while been harbored in a community whose general moral sta bade the possibilities of a further spread of the disease, the naturally died out.

Of other countries in which it has been claimed that the dis appears in a new or strange dress, unfamiliar to those who re elsewhere and called also by a different name, it is sufficient t the confusion has affected only the minds of the observers reported as to the facts. The "radezyge" of Norway resem history that of the "Norwegian itch," which was demonstrat microscope to be but the scabies of Europe with a new name, occurring in an exaggerated type. In the north of Europe, as elsewhere, the "spedalsked," or leprosy, has been confounded with syphilis, a fact to which interest is lent by the significant history of lepra in the Sandwich Islands, where the ravages of the last-named disorder have long been confounded with those of syphilis—a confusion which to this day, though to a more limited extent than formerly, still prevails. Indeed, of almost any land little known save to the active members of the Royal Geographical Society, where strange forms of a disease like syphilis are reported, it may be suspected that the malady exists there in manifestations unfamiliar only to practitioners of a narrow experience and provincial methods. The modern expert of our large cities, who reads the several pictures of syphilis as readily as the pages of an open book may be perused, has no difficulty in deciphering the phenomena which are a riddle to the conscientious practitioner of more limited range.

The words "endemic" and "epidemic" as applied to the disease are manifestly erroneous, and should be dropped from the pages of the syphilographer. Syphilis is never in its progress related to conditions of soil, water, or climate, and is never propagated in a wholesale manner so that entire communities are involved in its course. The most that can be observed in the so-called "epidemics" of the malady are a few groups of patients where the infection spreads from individual to individual among families ignorant of the source of the trouble. Occasionally (and in the light of modern science very rarely indeed) a professional circumciser with mucous patches in his mouth, a glass-blower, a tattooer, or a public vaccinator, similarly affected, will spread the disease among a dozen or more persons, its progress being at once checked on the recognition of the cause, which as a rule speedily follows.

The propagation of syphilitic disease respects, indeed, neither national boundaries, geographical divisions, nor the isothermal lines drawn across earth and sea. The disease is one whose increment is by populations, and whose lessons are well studied in the statistics of the census, the registries of the shipping lists, and the acquisitions of trade and commerce. It is, as distinguished from many other affections, not exclusively a malady of the filthy, nor an appanage of the poor, nor only a burden of the wretched, though all these endure its scourges. It is a plague which chiefly spreads where men are most closely aggregated either for temporary purposes or for permanent residence. It is thus most extensively seen in large capitals, in densely populated cities, in the towns where great fairs are held, such as those of Nijni-Novgorod, of Paris, of Vienna, and of London; where great armies are collected in the vicinity of cities; where trade actively springs up between two populous and distant centers. It is a disease chiefly of the second and third decades of life in the two

sexes, and occurs therefore in that age of the individual when the a
ties of the body are greatest as respects travel and intercourse wit
world, and also when the restraints of very early and middle life hav
yet, for most persons, become appreciated as effective. It is, lastly,
ease largely spread by promiscuous indulgence of the sexual instinct.
is therefore most often communicated in the period of youth, when
instinct acknowledges the keenest appetite. Geographically, there
syphilis is to be sought in that community where the population is
where it is actively engaged in trade with other populous commun
and where the men and women of an early age are not disciplined b
usages of an older society whose moral code is enforced by public
ment, as, for example, among the people of frontier towns coming
sudden and intimate relations with an inferior class of foreigners.

Among European countries, syphilis accordingly is found to p
extensively in Russia, especially in the large cities of Moscow an
Petersburg; as also in Jutland, Norway, Sweden, Poland, and
mark. The colder climates, where one might suppose on *a priori* gr
that the habits of the enervated and effeminate residents of the t
would not be countenanced, seem to have, in the larger centers of p
tion, the effect of stimulating the passions of men and women cro
together densely in the cities and seeking in drink and debauch
respite from the cheerlessness of an inhospitable climate.

Syphilis prevails extensively in Great Britain, more particularly
the coast lines of England and Scotland, and in the larger cities, su
Edinburgh, Dublin, London, Liverpool, and Manchester. More
one and a half million individuals of both sexes are thought to
annually from the disease in these islands, though absolute relianc
not be placed upon statistics of this character, which are based large
calculation rather than on absolute registration. The subject has
regarded of such importance in connection with the public health
people of the British Empire, more particularly with regard to the
tation of the army and navy, that laws to a certain extent regu
public prostitution have been there enforced.

In Belgium, Prussia, Denmark, Switzerland, Austria, German
Italy syphilis prevails with an intensity and frequency varying wit
social conditions and enterprises of successive years. The statistic
nished by experts in these countries are in general gathered from ve
patients submitted in hospital to the treatment of physicians, and ar
fusing to the student of syphilis, since they to a large extent represe
totals of cases, both local sores ("chancrelle," "soft chancre," etc.), bl
rhagias, etc., and also because they do not furnish the basis for an est
of the number of cases occurring which are never reported in p
practice. It is probable that somewhere between five and fifteen pe

of all venereal cases are syphilitic; and, of all diseases treated by physicians, it is surmised that, in the densest populations of Europe, between one and five persons in a thousand have been infected with the disease.

France, since syphilis first was christened with its name, has been the country where, up to within a comparatively recent period, the disease has extensively prevailed, been carefully investigated, and become most familiar to the common people. Mauriac believes that there are annually between five and eight thousand persons infected with the disease in Paris alone; which suggests that between two and four in every thousand of the citizens of that metropolis are newly infected persons.

In eastern Europe—Hungary, Croatia, Roumania, Albania—and the islands of the Mediterranean Sea, syphilis prevails in almost numerical proportion to the population and commercial activities of the people in the countries named. In such mountain districts, for example, as Albania, the hardy mountaineers, little corrupted by admixture with the traders of the Adriatic, furnish an illustration of the rarity and benignity of the disease, to which a strong contrast is afforded on the island of Malta, where, on account of the trading facilities offered by the supplies there of cheap goods of British manufacture, the proportion of syphilitic to healthy soldiers in a single English regiment was at one time reported as high as fifty-seven. Gibraltar occupies in western Europe almost an identical position as respects commerce and social intercourse between the people of Spain, Africa, and the Mediterranean ports; and it also pays a price in the spread of syphilitic disorders for its profits in barter.

Turning to the Asiatic continent, we find, as usual, the disease extensive in densely populated centers, like those of Japan and China, where so severe have been the consequences to sailors and others visiting their seaports, that the words "Chinese pox" and "Japanese pox" have almost passed into the English vernacular. But it is well known to-day that these names merely signify lesions of a disease made familiar by a daily experience to the attending physicians and surgeons of all the larger hospitals of Europe and America. It is reported, however, that in the interior of these countries, to which the foreigner has not yet penetrated with ease, there is a distinct decadence in the frequency and severity of the disease. In Asiatic Russia, Siberia, Kamtchatka, Afghanistan, Beloochistan, Syria, Asia Minor, and all parts of India, cases of the disease are reported always in greatest diffusion in the centers of population and trade.

Syphilis exists in every district of Africa that borders on the coast line. In Egypt, especially in Alexandria and Cairo, so largely visited by foreigners, the disease prevails not only among the latter, but also among the native fellahs and fellahines. As in the Sandwich Islands, it is here often commingled with lepra and other diseases. It can be traced along the Mediterranean shores to Tripoli, Tunis, and Tangiers; thence the western seaboard to St. Paul de Loando and the Cape. It exists in Algiers, Abyssinia, and Madagascar. According to travelers in tral Africa, the negroes of that vast region are not affected with syp and, when the malady is once imported among them, are singularl empt from its graver forms. These statements are to be accepted with great caution. Certainly the diffusion of the disease amon inhabitants of the Cape is quite comparable with that observed i larger capitals of Europe; and there is no need to imagine that a mixture with the blood of the white is needed to furnish a fit cul field for the germs of the disease. The fact, if such it be, is to b plained by the scanty opportunities thus far afforded for the transmi of the disease by the medium of the few companies of half-exhauste venturesome foreigners who have thus far penetrated to the recess the dark continent.

Syphilis exists in nearly every part of the Western hemisphere, much less extent in Greenland and the vast wastes of British America than in the larger towns of Canada, such as Montreal, Qu and Ottawa. In the United States of America syphilis is to be fou most of the larger populous centers, being most abundant in New Chicago, San Francisco, New Orleans, Philadelphia, Boston, Balti and Buffalo. In very many of the smaller towns and villages, pa larly of the interior and in districts little visited by steam vessels and way carriages, it is practically unknown. It is of rarest occur among the country people of distinct type, such as may be found vi by tourists, but little or only for a brief period during the summer, i forests of Maine, along the shores of the New England capes, in the populations of Alabama and Wisconsin, and among the dwellers o islands of the sounds, the bays, and the Great Lakes. It exists amon native American Indians, particularly those who have come into inti relations with the whites during the last two decades, but is almos known among the few descendants of the Indians still living in communities, under protection of the laws, among the older Ea States of the Union.

Syphilis is exceedingly common among the American negroes, nishing in them the combinations of that disease with scrofula whic the wretched sequences of their long years of slavery to the domi race—a bondage, however, permitting concubinage to an extent th written in the faces of the mulattoes and quadroons of all parts o country, particularly in the Southern and Middle States. Syphilis a the negroes still living in numbers near the ground formerly tille them for their owners is, as might be expected, less prevalent than a those living in the large cities. So extensive is the disease among blacks and half blacks serving as cooks, waiters, domestic servants, porters, etc., that it is believed few of those at service in the great caravansaries can be found free themselves from all signs of the disease, and the children of parents equally free. Of the Chinese living in this country as temporary immigrants, it may be said that many are infected with the disease, as well as with lepra, which exists chiefly among those in California. The other foreigners living on American soil and chiefly affected with the malady are, in the order named, the Canadian-French, the Mexicans, the creoles, the Spanish immigrants from South America, and those of Scandinavian birth. The immigrants to the United States least often infected and most rarely contracting disease after immigration are the English, the Scotch, the Irish, and the Germans. In the matter of religion, the lower class of Jews are more often infected with the disease than are the same class of the Roman Catholic faith.

The spread of syphilis among the native American population, whether children of immigrants or of those several generations removed from immigration, is affected by social habits like those of the Old World. For the smaller towns, the disease follows with singular facility the lines of interstate commerce, and the borders of advance observed by the railways as they penetrate to prairie or mountain, where is hidden mineral wealth. As to the former, the commercial traveler, visiting assiduously every possible point where sales may be made, usually unmarried and necessarily accustomed to the most irregular living, may be cited as the possible carrier of disease from one point to another; while the mining and railway camps of the outposts of civilization are usually earliest to sow the seeds of a disease reaped later by those who follow them with the erection of permanent homes for their families. A map of the United States, indicating with dark lines the extension and directions of extent of syphilis, would probably show a fan-shaped figure, the point of the handle in the city of New York, the other extremity of the handle in the city of Chicago, the rim of the fan spread more thinly along the seaboard from Alaska to Texas. The older States of the Union above and below this figure, New England and the State of New York above, and the Southeastern States below, would, without question, appear relatively free. These statements are based on a study of the statistics of the disease as they have appeared from time to time in the medical literature of the country.

During the late civil war of the United States these estimates would not have held good. The massing of enormous numbers of men in novel situations altered to a surprising degree the localities and preponderance of many diseases not directly due to the contingencies of battle. In this particular, syphilis shared with scabies for a few years an unenviable preponderance.

EVOLUTION, COURSE, AND STAGES OF SYPHILIS.

Syphilis is conveyed from individual to individual by acqui
("contact syphilis" of the Germans), and by inheritance. The evol
of the disease in the two cases is marked by decided differences.

In acquired forms of the disease the infectious germ or its inf
products may be conveyed in a physiological or pathological fluid,
living or dead protoplasm, or be the result of such intimate tissu
junction that the morbid materies passes directly from person to pe
The exact constitution of the "virus" has not been as yet determine
is the belief of the scientific world to-day that the infective esse
either a micro-organism, or its material products the results of its inv
of living tissues. In the infected person capable of transmitting th
ease the uncontaminated physiological secretions are not known to
pable of becoming vehicles of the virus. Once commingled with
logical secretions they become virus carriers. The power of furni
an infected virus wanes with the progress of the disease. A person
ing from the grave forms of an ancient syphilis may be, as regards
persons, innocuous. Given, therefore, an infected individual in an
and infective stage of the disease, furnishing a secretion from his
mouth lesions, or anal plaques, which is immediately applied to a r
to an abraded surface of skin or mucous membrane, or over an unbr
surface where it is left in contact and subsequently produces its
erosion; or which, lastly, is mediately applied on a utensil or artic
clothing at the point where the virus gains access to the sound indivi
an "infection" results. At this point of infection and at the mome
its completion a pathological process begins, which results later i
local evidence of that infection, viz., a chancre. A period of incub
succeeds the moment of infection before the evolution of the chancr
comes clinically evident. This period of incubation lasts from bet
fifteen to thirty-five or forty days. The average of most care
watched cases is twenty-one days. Analogy teaches that during
interval the germs conveyed in the infective process are multiplying
inducing that series of changes which result in the noxious produc
invasion.

Thus early, then, in the course of the disease, we are confronted
a question of time. This question, as will be seen, has been assign
the past an undue importance, because of its striking significance i
early period of the disease.

Once developed, the chancre signifies that the patient is syphi
The latest results of the study of the disease have not thus far destr
the value of the old axioms, that every case of acquired syphilis me
precedent chancre, and every chancre a consequent syphilis. The

of acquired syphilis reported without chancre are known to be those merely in which no chancre was discovered.

There is no need in these pages to thrash over again the old straw of the "unicity or duality of the chancrous virus." No one to-day doubts that syphilis is a unique disease, and that in a thousand forms, mayhap, but always with some sign of specificity, its first obvious symptom after contact transmission is a chancre. Usually this lesion is a moist or dry papule, which, because of its more or less rapidly acquired, slight or dense subjacent induration, is known as the "initial sclerosis" of the disease. The sclerotic deposit within or beneath the lesion apparent to the eye, due to an infiltration of connective tissue and a multiplication of cells within and about the lymph and blood-vessels, may occur at any point where transmission has been effective, upon a sound or pathologically altered skin or mucous membrane of any part of the human body, upon a cigarette-burn of the lip, upon a herpetic vesicle of the prepuce, over a sound frenum, a surgeon's wounded finger, or a nursing mother's nipple. Usually where infection operates, the chancre-bearer has never been previously infected. The exceptions are few, and those reported generally open to doubt. It is probably true that pseudo-chancres may occur in previously infected subjects that are not followed after healing by the usual sequelæ of the disease.

Neither from the length of the incubation stage, nor by signs apparent in the chancre, can trustworthy predictions be made as to the grade or duration of the oncoming disease. The mildest forms of chancre may be followed by grave syphilis; and the reverse is true, that with severe initial sclerosis, usually single but at times multiple, there may follow the most insignificant of systemic symptoms.

Usually soon after the appearance of the chancre, signs of an infective process appear in the enlargement and induration of one or several, usually the latter, of the lymphatic glands in the anatomical vicinity of the site of infection. These constitute the so-called syphilitic bubo. The adenopathy, as a rule, first noticeable between the sixth and tenth day after the appearance of the chancre, is well-nigh constant of occurrence, scarcely two per cent of cases escaping. In these few exceptions, when there may be a soft fullness rather than the characteristic marble-like hardness of the pleiad of glands involved, it is supposed that the lymphatics leading to the part are sealed up by the rare accidents of gangrene, phagedæna, or other complications. This special adenopathy is justly regarded as the sign and seal of an escape of the specific toxine of the disease from its portal of access to the circulating fluids of the body, and through these channels to the system at large.

The term here employed is intentionally used to cover both the blood and the lymph channels. That the lymphatic glands are powerless both

to entrap and retain the virulent product wrought at the site of the
cre, needs no demonstration. This is proved by every case in
syphilis succeeds a typical dense adenopathy near an indurated ch
Though there be an obliterating endarteritis in many cases at the ch
site, the blood vascular channels must take part in this systemic in
tion—a part played at the moment when the glands exhibit their
ment of the morbid fluids conveyed to them from the site of inocu
Though the evidence here is negative, it is not to be therefore ig
Early excision of a typical chancre and of all enlarged glands in a
ical relation with it, has not sufficed to prevent the occurrence of
syphilis.

Attention has already been drawn to the historical and inter
fact that, by the late eminent Philip Ricord, the evolution of s
was divided into three stages, the primary, the secondary, and the te
The primary included the symptoms briefly reviewed above, thos
cerning the chancre and its accompanying multiganglionic adeno
The secondary period included the symptoms displayed during th
ceeding term, in which systemic infection occurred, with usually sy
rical and superficial cutaneous and other manifestations. This was
ly estimated at about one year in duration. Lastly, following this
of efflorescence, came the tertiary period, that in which the deeper
tures of the body are involved; that in which the disease com
ceases to be transmissible, in which it may produce its most destr
effects, or pass into a complete innocuousness and decline. The infl
of this doctrine of periods has been incalculably great and valuab
at once marked a revolution in the history, in the study, and in the
ment of the disease. It has dominated the minds of the medical
of all lands since it was first completely grasped by the intellect
master.

But it has served its day. To thoroughly grasp the proble
syphilis, it is now needful, for the time being, to emancipate the
wholly from the ingenious suggestiveness of this doctrine. It m
clearly seen to be nothing but an artificial device for classifying
clumsy way the clinical phenomena of the disease.

As a matter of fact, there is no line of demarcation between th
cessive phenomena of syphilis as they appear in the evolution of th
ease in any given case. From the moment when infection has
wrought to that of the gravest injuries, or of the mildest efflores
there is, when no arrest occurs, a gradual but continuous progress
the disease. This advance is commonly marked by interludes as st
as they are salutary. They may be due to the intervention of trea
or to changes in the general health of the infected due to other
Apparently capricious cessation of the advance of the disease may

since even the cutaneous symptoms of marked cases may wholly disappear without treatment. If we were in position to view with keenest scrutiny the unmodified progress of syphilis in cell and vessel, no one can doubt that the so-called period of incubation would disappear, and the microscopic eye of the observer would be as busily occupied during that as throughout any other period of the disease. Similarly there would be no sharp distinction possible between primary and secondary syphilis. One could scarcely note the hour when, from the first to the last, there was not in progress a slow and gradual progression from point to point of the toxæmic product originating in the changes wrought at the site and at the time of infection.

These suggestions are needed for a clear comprehension of the phenomena following the stage of so-called "primary syphilis." The "primary" hypothesis made it absolutely necessary to also assume that after the primary came a secondary, and, after a secondary, an inevitable tertiary stage. More, the mind thus habituated to a study of the evolution of the disease in periods, looked to an evolution of symptoms in these periods in due order and line of procession. One was thus educated to expect in a typical and uninterrupted attack of syphilis (could such be observed) each and every one of the several manifestations of the disease. After macules, papules should appear, and, in course, pustules, tubercles, gummata, ulcers, and successive involvement of organ after organ of the body. Some such definiteness of order is, in point of fact, to be recognized in the evolution of variola, with which, unfortunately, syphilis has been too often and too closely compared.

But no such syphilitic history has ever been observed. It is the artificial manikin of the schools, the figment required by the domination of the medical mind by the time rules of the French school. It was this once useful and ingenious time schedule which made it equally imperative for the French to coin for some of the manifestations of syphilis the striking terms "precocious" and "tardy," words which embody a confession of the weakness of the schedule to explain all the exact clinical pictures of the disease.

Dismissing, then, the conclusions based on this wholly artificial scheme, it can be clearly recognized that almost immediately after lymphatic adenopathy has declared to the eye and the finger of the observer that the toxic product of the chancre-site is finding its way into the vascular channels of the body, the phenomena of the disease are evolved, not in the order of a time card, but, to employ a different figure, in radii from a pathological center. Early, indeed, in many cases, can it be seen that the future of the malady is to be sought along one or another line toward exceedingly variant results. The complexus of these results may be conveniently classified in four divisions, which are named later.

Toward these the advance is either slow or rapid. The grave be imminent when the chancre is yet unhealed, the adenopathy unre the lymphangitis discernible. The mildest may be attained when r have passed, the early accidents well-nigh imperceptible or for and the general health of the infected individual meanwhile not mar impaired.

Whether this apparent interval (the so-called "secondary per incubation") be brief or protracted, none can doubt that when a mate evolution of the disease occurs there is a continuous progress systemic intoxication. When well marked, this apparent interval o from forty to fifty days, but it has been noted as brief as twenty prolonged as a twelvemonth. Its limits are usually defined betwe date of the chancre appearance on the one hand and the date of th cutaneous exanthem on the other. That this is a purely artificial tion, becomes at once apparent when one of these dates of limita questioned. There is nothing in a cutaneous exanthem which ent to pre-eminence above other symptoms of syphilitic invasion pe evident during the so-called second incubative stage. From the da assigned to the last arbitrarily selected, there is no real pause, r spicuous absence of invasion signs. On the contrary, the sympt this period are often more suggestive and significant than when, ample, the skin of the patient's belly is merely sprinkled with a m syphiloderm.

The merest enumeration of symptoms possibly occurring i period of apparent pause is sufficient to indicate that no real incu can be observed. Yet here, again, it is important to note that not the enumerated symptoms are to be observed in one individual further, that they observe no definite order when two or more cha be parts of one syphilitic history. Rather are they different surf dications of the several lines along one or another of which the may advance toward its ultimate results.

After the chancre appears and before the first exanthem of g syphilis follows, the condition of the average patient is far fr apparently sound health. The blood-globules commonly decrease, the leucocytes by actual enumeration increase in number. The gla the body elsewhere than those in the region of adenopathy ne chancre-site slowly or suddenly enlarge, become tumid, painless, less indurated than those first noted in the disease, and are ofte metrically rather than, as in the other instance, asymmetrically inv The spleen, so intimately is it concerned with the fluids traversin vascular channels, becomes tumid and at times tender. The liver tion is often disturbed, as shown by an icteroid skin, with muddy co tive and the appearance of bile-products in the urine. The functi the stomach, of the bladder, of the uterus, of the suprarenal capsules, and of other viscera, may be even seriously impaired. Continuous or interrupted febrile temperatures may be reached, the thermometer rising at times even to 105° Fahr., the patient being not rarely treated, by a physician ignorant of the nature of the effective poison, for an intermittent or relapsing fever. The nervous system may seriously suffer. Atrocious neuralgias, substernal and periosteal pains, pains in the bones and joints, osteocopic sensations, and even synovial effusions, may be the protest of the system against the advent of the recently introduced poison. Often there are signs of mischief even of a severer type. The lassitude and depression are profound; a condition of mental hebetude gives place to partial syncope; a headache results in a temporary strabismus; a pain in the upper or lower limbs is followed by muscular contracture. None can doubt that in a carefully studied case where the evolution of syphilis is actually in progress, however mild its future is to be, a skilled diagnostician could recognize at one point or another of the body presumed to be in the stage of this so-called secondary incubation, unmistakable evidences of an insidious advance of the malady.

The term "explosion" has been repeatedly employed, with many other metaphorical phrases, to describe the moment when the first cutaneous exanthem appears. Its use is an index of the absurd and extravagant importance attributed to the onset of skin symptoms in early syphilis. As a matter of fact, the latter are surface indications of more serious and deeper processes (probably involving the nervous centers), and are all-important to the eye only of the vulgar. As a matter of fact, too, they never occur by explosion. The first efflorescence of the disease may be as gradual as the dawn of day and as impossible to define. Before the human eye traces its first expression, the camera of the photograph can produce with fidelity the faint mottlings of a skin that is to be later visibly the seat of a syphilitic efflorescence. No one who has with minute care watched the oncoming of the cutaneous manifestations of the disease can have failed to note how insidiously the approach is made to the eye. An accident may change all. The excessive heating of the body in a bath, or by dancing, may simply precipitate the blushing of the first rash.

This once apparent—and, let it be noted, even without this—syphilis exposes its advance in numberless directions, probably in no two cases exactly the same. These advances may be, however, for practical purposes, classified in four principal directions, as previously suggested in these pages. They may be named and briefly sketched as follows:

I. *Benignant syphilis, with mild and transitory symptoms.*

Every vacciniculturist has recognized the fact that a few heifers fail to respond to all efforts to inoculate the udder with vaccinia. The reason is not explained; the system of a few individuals in every thousand ply refuses to react against the introduction of the poison. No e of wide experience can fail to have been impressed with the fact o existence of this exceptional class of human subjects with respe syphilis.

There are persons who exhibit typical chancres with characte adenopathy of the vicinage, who never after exhibit the slightest sig systemic disease. The objection to this statement is suggested at on the mind of the uneducated. It is, that an error was made in the di sis of the initial sclerosis. That which seemed to be a syphilitic ch was really not such, but spurious, an imitation of the genuine le But, it is responded, such chancres have been not carelessly but wit quisite skill studied by experts, and found not different from others lowed by grave syphilis. Further, the persons enjoying this immu have failed later to contract the disease when exposed to it; and, important than all else, individuals of this class correspond to othe the same class who, having actually exhibited such chancres, do later systemic symptoms of such mild type as to astonish those unfamiliar these singular exceptions to the rule.

These interesting exceptions are either the triumphant proofs of skill of the physician, or (what is far more probable) proofs that som the phenomena of natural law defy ultimate analysis by the human m Persons of this class have typical, severe or mild, premonitory chan In due time they have also slight ganglionic engorgement, post-occip along the nucha, or in the line of the sterno-cleido-mastoid muscle. exanthem occurs, of macular type, upon the belly, over the chest, slig upon the face, or perhaps limited to the trunk. When this fades, or even without medical treatment, the disease is absolutely at an The ignorant declare that ten, fifteen, or twenty years after, this indi ual will suffer from a gumma of brain or liver, and be the worse for mildness of his early syphilitic history. But some of these patients h been watched during the longer of the intervals named, without sign resulting disease. Only the obstinacy of fixed prejudice can refus accept the necessary conclusions. These cases are not the figments of imagination, but are annually observed in every extensive syphilitic p tice. They are not rarely seen in women who have been infected, w out their knowledge, by a husband, or by the innocent contacts of d life.

II. *Benignant syphilis, with relapsing or persistent superfi symptoms.*

Cases assignable to this category are those in which typical chanc are followed by typical early manifestations of general syphilis, the tient continuing for months, or even years after, to be annoyed by intr ably persistent or relapsing but wholly superficial syphilitic symptoms. If described according to the former phraseology, these would be classed with the subjects of prolonged secondary syphilis, never proceeding to tertiary stages. Two, three, and four years after infection such subjects are found with an infiltrated patch of scaling papules on buttock or back; with mucous patches of lips, tongue, or fauces; with a squamous palmar or plantar syphiloderm; or with a cluster of superficial and crusted papulo-pustules over the occiput or temple in the pilary region. After alternately trying and tiring of all methods of treatment, the disease at last yields. Throughout all, from first to last, there is no sign of a formidable malady. When recovery has at last occurred, no trace is left on the body of the infective process. There has been no deep ulcer, no cicatrix, no permanent impairment of any organ or tissue. The disease, viewed in retrospect, has been perhaps a long but always rather an annoying than a dangerous affection. It may never have for a day prevented attention to the routine work of the sufferer. Had it not been for the incidental apprehension of the future, it would not have attracted serious attention nor demanded assiduous care.

Such, without any question whatever, is the course of the majority of all cases of syphilis. They are watched with intensest anxiety by many physicians, lest the serious phases of syphilis ensue, and with feverish alternations of hope and despair by the nervous and instructed of those who endure the ordeal. It is these which furnish the text for the prophets who claim that, however mild be these histories, each is liable to result in the graver forms of the disease, and that which determines the difference is treatment, always of highest importance. Against this palpable error—an error fostered by the pitiless time-schedule of the French school—it is proper to protest. The most superficial study of syphilitic statistics demonstrates without flaw that the majority of all patients—with the best, with the poorest, and without treatment—escape what has long been termed tertiary syphilis; in other words, do not exhibit the destructive types of the disease. The percentage of the latter to the former in both hospital and private practice has been estimated at the lowest at about seven per cent, at the highest at nearly thirty per cent. The corollary therefore is wholly trustworthy that at the least two thirds of all patients in all countries, and subjected to all methods of treatment or none (homœopathy, ignored cases, expectant treatment, "mind-cure," etc.), escape the destructive ravages of the disease. It is upon this issue in the immense majority, and not upon the dreaded results in the minority, that the evolution of syphilis in the average of cases is to be predicated. Nothing that is here set down is to be interpreted in denial of the equally palpable fact that the mildest case of syphilis at the outset may become the severest in the end; that the patient fairly launched in the direction of benignancy may be mischievously turned in a diffe and more dangerous course; that scientific treatment of the disease nishes one of the greatest triumphs of human ingenuity and skill. here intended merely to look at the results of the evolution of the dis among all classes of men and in all countries from the broadest poin view. The lesson taught, not for the one case but for the many in a study, is that in this second category of mild relapsing or persis superficial symptoms are wholly included the immense number of cases and of all phenomena of the disease.

III. *Malignant syphilis, with relapsing or persistent profo symptoms.*

A recent French writer has well distinguished between the syphil that resolves and that which degenerates. In this third category included all patients exhibiting gummatous lesions that are either solved and do not return but leave serious consequences behind; or are resolved and return later with serious consequences after either o outbreaks; or that persist with no less harmful results. Here, too, variations from the less to the more dangerous grades.

Any one of these conditions may develop after the patient has hibited only such lesions as would justify his being classed in the categ just considered. But it is highly important to note that all the sy toms here described and catalogued may succeed the chancre stage w out intervention of milder symptoms and also without an interva time. Early, indeed, after the chancre has healed, often before this la completed, there are indications of the evolution of the disease towa malignant type.

The "malignancy" of this class of cases is seen in the deteriora of the general system, and the production of a syphilitic cachexia witl absolute destruction of the tissues of the body. Gummata that ne ulcerate or degenerate may form in the skin, subcutaneous tissue, bo periosteum, periarticular and articular tissues, mammary gland, testis other organ. By the production of pain, by displacement, or mechan effects, by a subtle influence that is difficult of analysis on chylopo sanguification, or nutrition, and by interference with other functio disastrous influence is exerted that justifies the term malignancy in scribing the course of the disease. Its effect is most striking when structural lesions are few and not in themselves grave. A patient merely a submaxillary or periosteal gumma, or with an obstinate pa meningitis producing injury by pressure effects rather than by destruc action, may be in a graver physical state than another with a profo ulcer of the leg or of the throat.

In this category are to be found the smaller number of all case syphilis. It is pre-eminently the category of the transitory. They have suffered from a syphilis trending along these lines, either by force of good management or as a result of the self-limiting energy of the disease or the reverse of these, are readily transferred to the class just described, or that which is considered below.

IV. *Malignant syphilis, with relapsing or persistent and profound lesions that are ultimately destructive.*

In this category are classed all those patients who exhibit the worst phases of what is called by the French "*tertiarisme*," the symptoms which have made the disease to be dreaded as much as any of the pestilences which have visited destruction upon the human family; the histories which have engendered the popular and *quasi*-professional belief in the noncurability of the disease; those which have led philosophers to wish that the disease were one that killed rather than one that can so frightfully mutilate without killing.

Here the resolving or disintegrating gumma opens an avenue to ulceration that pierces through connective tissue, cartilage, periosteum, and bone; to resorptive results which when the gumma has disappeared, leave in its site shriveled secreting cells, nervous, hepatic, renal, osteoid; that leave the testicle a shrunken miniature of its former self; that leave a sclerotic tissue in the place of brain-cells or spinal cells, whereby one half of the body loses its motor function, or a portion of the brain its ability to preside over the function of speech. Here, too, remote as are these formidable consequences on the time-schedule of the French school, all are obliged to admit that but a few weeks may intervene between the chancre-evolution and the worst ruin. In a few days, while yet the induration of the chancre persists, the hard palate may be perforated as readily as the finger may be pushed through a sheet of wet paper; or a liver may be stuffed with ominous nodules; or the surface of the body plowed here and there with deep and even gangrenous excavations where a gummatous infiltration has rapidly melted to destruction. It is true that for the most part these grave results occur between the third and fourth year after infection; but the facts of earliest appearance of so-called late symptoms in syphilis are by none better attested than by the French themselves. It is they, indeed, who have coined for science the phrases "malignant precocious syphilides," and others of similar import. It is they who freely admit that the malignancy and precocity are in these cases intimately associated. It may even be asserted as a fact that the majority of all truly malignant manifestations of syphilis are precocious to the extent of violating the old rule of tertiary syphilis as a sequel of an orderly and classically developed secondary stage. It is the characteristic of these dreaded devastations of the malady that they are early declared and rapidly evolved as extremely formidable types rather than as dangerous complications or perilous sequels of lues. Even with the chancre unhealed, the surface of the body may be in these case dled with sloughing cavities. It is also the French who, confessing these are the cases inexplicable by their formula, have coined for the significant and comprehensive appellation, "galloping syphilis."

Between the four main lines of evolution briefly delineated a there are to be recognized clinically innumerable variations in the tion of both mild and severe symptoms. That these types mut merge and are to a degree interchangeable by the accidents of env ment, constitutional influences, and treatment, can not be questioned is therefore important to inquire what are the determining causes make the syphilitic attack of one individual so different from that o other that the physician who is quite qualified to make a diagnosis o one at sight, so utterly fails in the case of the other that the disease actually progress for years under his observation without being r nized.

Our ignorance at present of the limitations of existence and of opment of the germs whose toxine produces the disease, wraps ma these causes in mystery. But upon some of them one may pron with reasonable certainty.

For a certain school of writers the chief difference between variations in the expression of the disease is the absence of all treat or the several extremes of ignorant, indifferent, or scientific treatme the disease. To this wholly artificial explanation exception mu taken, since a cause of this sort, in order to account for the occurren a large number of cases, should operate generally, which it is impo to assert of the different grades of treatment employed over the for the relief of the disease. Looking at the immense number of subjected to observation in all civilized and uncivilized countries making allowance for the very imperfect methods adopted in diff countries and for the absence of efficient treatment in many, it is at noticeable that as many grave cases are catalogued in London, New York, and Chicago, as among the degraded classes in Italy or S or among the negroes of America, all of whom are little likely to fluenced in their diseases by scientific treatment. As a matter of also, in the gravest of "galloping" cases, as every candid observer admit, it is idle to assert that there has been time for even the an and best-directed treatment to save the patient from malignancy, the very poorest or the absence of all medication to be responsible f grave result. An efficient and demonstrable cause should be best dec when the result is immediate and striking.

Again, it has been surmised by authors of repute that the diffe in these cases is explicable by a difference in the activity of the ger by a variation in the intensity of the virus. But to this a negative is clearly set up by the citation of innumerable cases where, of several individuals infected from one person, no two exhibit the same degree of virulence in the character of the symptoms induced. The same is shown by confrontations in a series where the individual infected from the gravest types of the disease has mild syphilis, and another contracting the disease from this mildly affected patient pays a heavy forfeit for the occurrence of the accident.

Critically examined, the problem speedily resolves itself into a question concerning chiefly the soil in which the germ is planted, and the favorable or unfavorable conditions under which it develops and fructifies. Here is a large field of efficient causes which operate equally in all countries and under all skies. Looking at this field critically, we are at once struck with the fact that syphilis here aligns itself with all other diseases that destroy the race. Here, as in equally chronic tuberculous processes, in protracted cases of tissue-changes in lung, kidney, or liver, the debilitated, the exsanguine, and the congenitally weak, suffer more seriously than the men and women of brawn, of blood, and of vigor. Here operate with impressive energy the causes catalogued in the etiological chapter of every work on special diseases, viz., alcoholism, debauchery, pauperism, hospitalism, "misery," in the large sense in which the French use that term, and the wasting effects of all precedent illnesses and injuries. With other diseases, let it be noted in passing, there is small tendency in syphilis to combine. All have noted the smallness of the number of cases in which syphilis has coexisted in one individual with tuberculosis, carcinoma, or sarcoma. One might almost assert that it is with lepra alone that the disease has been in the history of medicine mingled to confusion.

Apart from the causes suggested above, it is well known that very fleshy persons, the aged and very young, are exceedingly liable to suffer from severe forms of the disease. Young adults of both sexes, neither fleshy nor thin, with good development, fair inherited vigor, and not debilitated by any acquired vices or exposures, commonly escape the serious issues of lues. It is an interesting commentary on the preponderance of causes effective in the production of grave syphilis, that decidedly the simplest cases, as regards the evolution of the malady, are those of persons infected by nonvenereal accidents, where knowledge of the nature of the disorder is speedily acquired.

It is, then, by the operation of the several causes suggested above, rather than by peculiarities of treatment or by the activity of the acquired virus, that the infected cases range themselves in the categories of evolution briefly described above. In the fourth, which includes the destructive and formidable ravages of the disease, there will always be inscribed

the largest number of names of the cachectic, the dissipated, the aged,
impoverished, the filthy, the neglected, and the weak.

This all admitted, it is scarcely necessary to further affirm that tl
are few triumphs of mind over matter to be compared with the brill
results obtained in a systematic and skillful treatment of this disease,
sults sufficient in many cases to determine whether any given sub
shall be exchanged from one to another of the several classes here
scribed; or be, in fact, so slightly infected as scarcely to deserve reco
tion in any one of the four.

CONGENITAL (HEREDITARY) SYPHILIS.

Infants and children of a tender age acquire syphilis, as do their eld
by contact-accidents (kissing, use of domestic utensils soiled with co
gious secretions, nursing from the breast of a syphilitic woman not
own mother, attempts at rape, etc.). There are, however, instances
acquired disease in infants (infantile syphilis) where the symptoms
not differ greatly from those of acquired disease in adults. It is t
that the tender skins of these patients make them rather more sensit
to external irritants, and are much more apt to display moist lesions ab
the vulva, anus, genital region, and the soft, *quasi*-mucous surfaces betw
their almost disused fingers and toes. But in these cases the children
infants are presumably in fair health when infected; the disease, i
attack the organs more deeply placed than the skin, making these
vances by its accustomed parallels.

In congenital syphilis, on the other hand, the disease is always stric
inherited. The new being is poisoned *ab ovo*, and is ushered into
world either as an aborted ovum, a miscarried fœtus, a nonviable infa
or as a newborn child surviving the peril to life only to exhibit, usua
before the fourth month, symptoms unmistakably pointing to the dise
of one or both parents. Here is not space to discuss the question whetl
syphilis of the child always implies that of the mother. Whether dem
strable or not by external symptoms, the latter is certainly shown in m
cases; and in the few reported exceptions there is grave doubt whetl
they really be such. The law of Colles, that the mother of the syphili
child is never infected by the mouth of her offspring, though every sou
woman who places such a child at her breast is liable to suffer, has, aft
years of study, been so seldom violated that it has been buttressed by t
broadest experience. Indeed, though mothers of syphilitic children a
repeatedly found where the most careful scrutiny reveals no trace of t
disease, women with such a history are now well recognized in their re
tions to syphilis. They are the protected victims of the disease. Th
belong to precisely the same class as do the men who, having had t
most trifling of syphilitic symptoms, forever after enjoy immuni

against the ingress of the poison. These mothers have had their symptom, as significant as it was in every view morbid. That symptom was the casting off of a syphilitic ovum, fœtus, or child, or of a series of such fruits of conception. These pathological evidences of disease are often the sole apparent maternal symptoms of infection; and, in, fact the profoundly syphilitic child seems often to be a symptom-carrier, a species of explosion of the disease on the part of the mother. Often such mothers are pallid and weak; but they not rarely are found presenting all external evidences of robust health, with rosy cheeks, brawny limbs, and breasts full of nutritious milk, which the weazened, yellow-tinted, snuffling, and puny syphilitic child is wholly incapable of assimilating.

Many of the problems connected with the transmission of syphilis to a second generation are still unsolved. It is well known that transmission to a third generation is exceedingly rare; that the child of parents with syphilis then recent is more apt to suffer than its younger brothers and sisters, begotten when the disease of the progenitors has lost its virulence; that a syphilitic father, with a sound mother, is not certainly known to be able to contaminate the fruit of conception, if the wife be not infected; that after conception, infection of the mother may contaminate the offspring, if the syphilis dates from the earlier periods of the pregnancy, though it is thought by a small number of observers that after the seventh month of such pregnancy the child escapes the maternal virus. It is also clear that, as the disease wanes in the parents, a series of pregnancies usually results in the production of more and more viable offspring; and that finally, after abortions and miscarriages, even sound children may be born; that in cases, as the disease of the progenitors waxes and wanes toward a decline, or is improved or the reverse by vigorous treatment or neglect of the latter, diseased and healthy children may be alternately begotten in the series.

The living syphilitic child is brought into the world diseased in any or all of its tissues. It may be recognized at birth as the victim of gummata of liver, bone, lung, testis, thymus, spleen, eye, ear, or skin. The characteristic "snuffles," due to involvement of the mucous membrane of the nose; the pemphigoid lesions of palms and soles; the osteo-chondritis of the epiphyso-diaphyseal junction in the lower extremity of the radius; the fissures, excoriations, and mucous papules of anus, lips, or vulva—all may be declared without observation of order in their evolution or progress toward destructive change. When survival is enjoyed till the later periods—that is, with a first display of congenital symptoms in the tenth, eleventh, or even twenty-first year of life—the well-nigh remediless distortions, ulcerations, and atrophies which result are among the gravest of the destructive ravages of the disease. For the majority of all forms of inherited syphilis the issue is fatal. The affection is one which may be

described as reserving its deadliest shaft for the victims of the sec
generation.

GENERAL PATHOLOGICAL ANATOMY.

After a series of unsuccessful attempts previously made to iden
the micro-organisms whose toxic product results in the production of
lesions of syphilis, Lustgarten has described a bacillus which has l
recognized in the centers of a syphilitic process in almost every stag
the disease. It measures from three to seven millimetres in lengtl
moderately curved upon itself, and has slightly swollen terminal extr
ties. It has been stained with gentian violet, and decolorized with
manganate of potassium and a sulphuric-acid bath. Under the mi
scope, three or four of these bacilli may be found both within and betw
the masses of protoplasm. Unfortunately, this microbe has as yet
met the severe test of a truly pathogenic bacterium: from culture
inoculation has been made with the result of producing syphilis. Wh
er, under improved methods of staining and culture, it or anothe
ultimately demonstrated as the effective pathogenic bacterium of this
ease, the scientific world has to-day practically accepted the view tha
the multiplication of some similar organism the characteristic virus of
disease receives its toxic characters. The sclerotic condition of the c
cre is produced after the introduction of the virus at that point, by d
infiltration of the connective-tissue elements with embryonic cells, am
which may be found isolated giant cells. The stuffing of the blood-va
lar channels with these same cells, clustered too about the exterior of
lymph-channels, has already been referred to.

The syphiloma, or morbid product of syphilis in all its mate
lesions, is a neoplasm of granulation type. In these the upper layer
the corium are swollen with a semiliquid infiltration, the overlying
thelium participating with frequent inflammatory products in the gen
process of infarction. There is no building up of strictly new tissu
these formations; no new blood-vessels are at first formed. Later,
a more abundant infiltration, vascular elements are abundantly develo
as is especially well demonstrated in gummata of brain and testi
Often, when scrutinized with the naked eye, gummata of viscera—of
liver, for example—are readily detected as minute grayish-red or gray
white, pin-head and larger sized bodies, which under the microscope
found to be nests of well-packed embryonic cells, surrounded by a de
mesh of connective tissue with radiations passing toward the nor
hepatic cells in every direction. These granulation masses undergo m
morphoses and are environed by the several results of tissue-char
noted elsewhere, such as inflammation, suppurative degeneration, ca
tion, fatty metamorphosis, and even absorption without result, save

where such has occurred the normal cells have in consequence of displacement wholly disappeared.

In many cases the gummatous deposits of syphilis when occurring in distinctly circumscribed rather than in equally characteristic diffuse forms, exhibit after a time centrally placed caseous masses, either spheroidal in outline or wholly irregular, which are environed with a dense tissue of sclerotic hardness constituted of the transformed connective tissue, from which, as in the cases previously described, stellate radiations of similar nature stretch toward and often deeply into the surrounding normal tissue.

Gummatous infiltrations exhibit in the most marked degree the capacity of absorption and final disappearance without degeneration or ulceration. This peculiarity is nowhere better displayed than in the testis, where complete involution of one or several gummatous nodules may leave a shrunken and withered organ scarcely one fifth of its size before the involvement. The same picture is shown pathologically in the condition often described as dactylitis syphilitica, where, after absorption of the gummatous thickening, the phalanx which was originally three or four times its normal size is reduced to an attenuated shadow of its former self, or may even wholly disappear, and be represented, as the second phalanx by this process approximates the corresponding metacarpal bone, by a slender connective-tissue pedicle. When destructive effects by ulceration result from breaking down of a gummatous product, not merely does the infiltrated tissue ulcerate, but this process once begun may extend into sound tissue, the ulceration spreading and destroying in its path every opposing anatomical element. These processes are unquestionably advanced by the endarteritis obliterans which accompanies and even precedes so many of the syphilitic formations, the lumen of the vessels being often quite obliterated by thickening of the vascular walls, by an increase especially in the thickness of the middle layer.

The difference between the retrogressive metamorphosis of gummatous and other lesions lies objectively in the appearance, in the relics of all other processes, of a special pathological occurrence (for example, blood-staining of the walls of a cerebral cyst, after an apoplectic effusion in the brain), while the relics of the gummatous process, whether the sequels of resorption or ulceration, never bear evidences of any special pathological changes other than the mechanical loss of tissue.

In the matter of syphilitic gummata involving the nervous centers, the labors of Heubner, Wegner, Wilks, Barlow, Parrot, and others have thrown a flood of light upon the existence of tangible lesions in and near the nervous cells of brain and cord, in those fatal cases where, not many years since, even though syphilis was known to have been the cause of the fatal result, its exact mode of evolution was wholly unknown. The oc-

clusion of the lumen of the cerebral arteries, by thickening of the
of these vessels, occurs in nearly every severe case. Spreading fro
point of localized infarction, the indirect results may involve tissue
distance from the site of the original gumma. As a consequence, sc
ing, ulceration, caseation, and metamorphoses similar to those occu
in other pathological processes, may be hastened in localities where
had been no primary syphiloma.

These same features of syphilitic infection may be recognized p
logically in all its inherited forms. In these, too, the characteristi
behaving gummatous product, circumscribed or diffused, invades
and tissue with more disastrous results than in the adult, merely be
the subject is infected *ab ovo* with the special toxine of the ma
Here, however, may be named, as of striking and peculiar behavio
changes in cartilage and bone, which are believed to occur in al
every case of inherited disease. In one of the forms, for exampl
scribed by Wegner, of osteo-chondritis, at the epiphyso-diaphysea
tremity of a long bone, premature ossification goes on with the incr
proliferation and growth of individual cells; or there may be a
arrest of the bone-making process by premature sclerosis of the
cellular hyaline matrix of the cartilage. An atrophy is also desc
by Parrot, where rosy or yellow-tinted jellylike foci develop at th
of junction of epiphysis and diaphysis, and where eventually, in pla
a bone, a loose reticulum is formed of fibro-cellular structure.

In still other cases described chiefly by Parrot, osteophytes of
ing thickness, projecting at right angles to the osseous shaft, de
from bony trabeculæ, interlacing at one or several points beneat
periosteum. Examined under the microscope, there is recognized a
ceedingly irregular arrangement of the Haversian canals and osteob
In some instances these osteophytes result in the production of poro
at the points of involvement, the results being strikingly similar to
seen in rickets.

Before, however, the infant affected with inherited syphilis is br
into the world, it is probable that the placenta, with which it was
nected *in utero*, was involved in a diffuse or circumscribed gumm
process in which the endometrium participated. Here have been
ognized polypiform projections, of highly vascular constitution, n
tumorlike masses, sclerosed plaques, and other results of the syp
hyperplasia. Fusiform, roundish, and multinuclear cells here also
ceed either to necrobiosis or to the organization of sclerotic masses,
do not differ from the results of the same hyperplasia in the bone s
lis of the congenitally affected, or from the changes exhibited b
gummata of the spleen in the acquired forms of the same disease.

Viewed as a whole, it must, however, be frankly admitted that, from the distinct recognition of a special micro-organism in etiological relation with syphilis, the microscopic examination of its lesions, even by the most expert, is far from furnishing the most satisfactory results. There are very few modern pathologists who would to-day venture a diagnosis of syphilis after examination of tissue changed by a gummatous infiltration, if there has been no opportunity of studying the clinical history, objective gross symptoms, and behavior of the neoplasm under efficient treatment. A correct appreciation of the patient's history, and the detective influence of specific treatment, are most important in enabling us to discriminate between specific and nonspecific new growths. Even when the results of microscopical examination may appear to be conclusive, the verdict of the histologist may be reversed on appeal to the practical test of treatment. Nevertheless, in all tests, the valuable aids to diagnosis furnished by absence of the characteristic changes to be recognized in typical epitheliomata, sarcomata, myo-fibromata, and other morbid growths, can scarcely be overestimated.

Recent investigation indicates, indeed, with tolerable clearness, that the anatomico-pathological distinctions between the syphiloma, the lupoma, and the leproma on the one hand, and sarcomata, epitheliomata, and allied formations on the other, are best studied as variants of a normal histogenesis. They are, in fact, distinctions which do not solely rest upon the recognition of a bacillus, upon the chemical effect of ptomaines, upon the discovery of a "pseudo-parasite," of a giant-cell, of a psorosperm, or of evidences soon probably to be more distinctly appreciated, that a salutary phagocytosis has in any one of these morbid processes been interposed. The recognition of each will be rather more certainly determined by the mode of behavior of proliferated cells, infarcted lymph and vascular channels, and reticulated connective tissue; their tendencies to produce scleroses which persist, or granulation masses which are apt to undergo necrobiosis; and their disposition either to become localized or to beget secondary deposits by metastasis.

A study, in short, of the histology of syphilis at the present day suggests in the most remarkable manner the fruits of a careful study of the clinical features of the same disease. It has been said that syphilis "imitates" almost every other disease. The figure is one suggestive of fact. In the study of its manifold clinical features it becomes apparent that these may, with the most deceptive minuteness, resemble those to be seen in nonsyphilitic disease; and yet, however close the resemblance, one is never left without a few signs of a specifically different malady, which may always be looked for with confidence, and, when discovered, trusted. So in the microscopical examination of tissues changed by the syphilitic process: they are not strikingly different from those examined in a thousand other morbid states. Their microscopical features may somewhat resemble those displayed in the section of a cutaneous carcinoma nerve-tissue in lepra; but with careful scrutiny one may always di guish certain peculiarities which enable the trained observer to de that the two are not the same, and that the excursion is in the dire of the variations seen in syphilis.

THE ETIOLOGY OF SYPHILIS.

BY JOHN A. FORDYCE, M. D.

EVERY-DAY experience teaches clinical observers that syphilis depends upon a virus which gains access to the system through a local abrasion, first producing local changes of an inflammatory character, then a slow infection of the communicating lymphatic glands, followed by a general disease with various local disorders in the skin and mucous membranes. After a gradual subsidence of the symptoms through treatment or spontaneously, a period of latency in the manifestations supervenes, followed in some instances by recurrences of lesions, probably from portions of the virus deposited in the tissues and aroused into activity by various causes.

It was suspected, long before the elaboration of the germ theory of disease, that syphilis owed its origin to a living contagion that adhered to the specific lesions and was present in the blood of persons affected with the disease; that it could be conveyed both directly and by inheritance, and might remain in the body in a latent condition. Fernelius, in the beginning of the sixteenth century, clearly expressed opinions regarding the infectious nature and hereditary transmission of the disease which to-day retain their full value.

Modern pathology has grouped a class of diseases under the name of chronic infective granulomata which present many analogies both in the manner in which they begin, their subsequent behavior, and their pathological anatomy. The majority of them are inoculable, and may begin with a well-marked local lesion from which the general infection results. In many of them the virus retains its activity for long periods of time, and in certain stages producing lesions which are local rather than general.

This group of affections includes tuberculosis, leprosy, glanders, and probably mycosis fungoides and certain malignant tumors. As micro-organisms have been shown to be constantly present in the lesions of the first three named affections, and in all but leprosy proved to be their etiological factor, the conclusion is forced upon us that syphilis owes its existence to an analogous cause.

Although much painstaking labor has been devoted to efforts to discover the specific germ which we must believe causes the disease, up to this time no micro-organism has been found with sufficient frequency to enable us to say that even the first condition in the chain of evidence has complied with. The fact that lower animals can not be inoculated syphilis, and that cultivations from syphilitic sores or from the blood ing the active period of the disease yield no satisfactory or unifor sults, render the study of its etiology extremely difficult.

Hutchinson has called especial attention to the points of resemb which exist between syphilis and the acute exanthemata, in that a de period of incubation in all these diseases is succeeded by sympton general infection, with an outbreak on the skin and mucous surface transitory congestions of various organs and tissues.

The partial or complete immunity which is conferred by the exanthemata and syphilis is another striking resemblance between t It is also a noteworthy fact that in all these acute specific feve well as in syphilis, in which immunity is conferred by one attac essential cause has eluded investigation.

MICRO-ORGANISMS IN SYPHILIS.

History.—While the claims made regarding the presence of n organisms in syphilitic lesions before the establishment of moder teriological methods have only a historical value, it is interesti briefly note in chronological order what has been done.*

Donné (1837) observed in the secretions of chancres, suppu buboes, and gonorrhœal pus the *vibrio lineola* previously describ Müller. He remarked, however, that its presence was probably dental.

Hallier (Zeitschr. f. Parasitenkunde, p. 180, 1869) verified i blood of syphilitic persons micrococci which resembled those fou patients with scarlatina. In the same and following years, Klotzsc lisbury, and Bruhlkens claimed to have seen spores in syphilitic and in the scales from syphilitic infiltrations.

Lostorfer (Archiv f. Dermat. u. Syphilis, 1872) excited considera tention by claiming that he had found certain peculiar bodies in the of syphilitic subjects which had been kept for three days in a moist Wehl, Vajda, Neumann, Biesiadecki, and Köbner found similar bo the blood of healthy individuals as well as in those with syphilis.

It is now known that blood is an excellent culture medium, an various micro-organisms from the air readily find a lodging plac rapidly develop in freshly drawn blood, so that any conclusions these observations are entirely without value.

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* For more complete historical references, see S. Lustgarten; Die Syphilis B Wien, 1885; P. Baumgarten, Lehrb. der path. Mycologie, 1890; J. K. Proksch, I eratur über die venerischen Krankheiten, Bd. i; 1889, Contagienlehre; N. Senn, S Bacteriology, second edition, pp. 240, 248, 1891.

Klebs (Archiv f. experim. Path. u. Pharmak., 1879, Bd. x) examined the fresh secretions from syphilitic sores and portions of excised initial lesions. He claimed to find cocci and short, thick bacilli, and also to have succeeded in making cultures of these organisms from syphilitic tissues on a solution of gelatin. A monkey which he believed to have successfully inoculated with syphilis subsequently died, and from its blood he obtained peculiar spiral-formed organisms which he looked upon as a new species and named "*Helicomonads.*"

Bermann (1877), Culter (1878), Pisarewski (1880), Aufrecht (1881), Obraszow (1881), Birch-Hirschfeld (1882), Leistikow (1882), Martineau and Hamonic (1882), Morison (1883), Letnik (1883), Petrone (1884), Barduzzi (1884), and Tornery and Marcus (1884), describe organisms of various kinds in syphilitic products.

Martineau and Hamonic thought they had succeeded in inoculating pigs with a culture from an indurated chancre, and Cognard (1883) made a similar claim. Experiments with a like object in view by Köbner, Bayer, Horand and Cornevin, Neumann and Petrone, were without result.

This brief historical review of the work done previous to 1884 shows that the desired results were unsatisfactory and contradictory. No one succeeded in detecting a constant form of micro-organism in syphilitic inflammations; neither were the attempts to obtain cultures nor the inoculations of animals worthy of scientific consideration.

About the end of the year 1884, Lustgarten, in a preliminary communication (Wiener med. Wochenschrift, 1884, No. 47), announced that he had succeeded, by means of a special coloring method, in detecting bacilli in syphilitic tissue. Shortly afterward, in his second communication (Die Syphilis Bacillen, mit 4 Tafeln; Wiener med. Jahrbücher, 1885, Heft 1, page 89), he gives a more extended account of his investigations, and a detailed description of the bacillus and staining method.

Lustgarten's work excited general interest, and raised the hope that at last we were on the way to a more intimate knowledge of the etiology of the disease. The bacilli discovered by the coloring method in question differed from other similar organisms by their reaction to stains, and by their form and situation in the tissues. In size and shape they resembled closely the tubercle bacilli, but could be differentiated from these, the author believed, by their reaction to mineral acids, by the presence of knob-shaped swellings on their ends, and by the frequent appearance of bent and S-shaped forms. The syphilis bacilli were rapidly decolorized by nitric and hydrochloric acids, while the bacilli of tuberculosis and leprosy resisted the action of these acids much longer.

Staining.—*Lustgarten's Method.*—Sections cut as thin as possible are placed from twelve to twenty-four hours in Ehrlich-Weigert's solution of gentian-violet (concentrated alcoholic solution of gentian-violet

eleven parts, aniline water one hundred parts) at the ordinary temp
ture of the room, and finally the solution containing the sectior
warmed for two hours at 40° C. The intensely colored sections are
decolorized as follows: They are placed for several minutes in abs
alcohol, and from this transferred to a one-and-a-half-per-cent solutio
permanganate of potassium, where they remain for about ten secc
Then the cuts are transferred to a freshly prepared watery solutio
sulphurous acid, in which they partially or completely lose their c
From this they are washed in distilled water, and the procedure repe
several times until they are completely decolorized. The sections
now dehydrated in absolute alcohol, cleared in clove oil, and mounte
Canada balsam.

Cover-glass preparations are colored in the same manner, but wa
in water, not in alcohol. The bacilli which were in this manner dis
ered by Lustgarten appear singly, and in groups of from two to ei
inclosed in cells double the size of white blood-corpuscles. They ar
pecially apt to be found on the border line between the infiltrated
the sound tissue, but always in small numbers. Lustgarten examined
teen cases in all, including initial lesions, gummata, lymph glands, n
papules, papules from the skin, and secretions from moist papules
initial lesions. In order to control the results obtained by his colo
method, he was not successful in staining bacilli and cocci met with
variety of infectious and skin diseases. The examination of two
chancres gave a negative result. Attempts to obtain cultivations v
not successful.

In criticising Lustgarten's work, it should be borne in mind tha
though the author succeeded in demonstrating the bacilli in all the sy
litic tissues examined, they were present in extremely small numb
many sections containing none, while in others one or more might be
countered after painstaking examination.

The coloring method is difficult, and, even after repeating the deco
izing procedure many times, portions of the dye remain which hin
the examinations. The small number of bacilli met with, even by
most experienced investigators, renders an examination to determine t
presence or absence in the tissues a laborious and tedious undertaking.

The absence, as a rule, of giant cells in syphilitic tissue deprives
of the assistance rendered by these cells in tuberculosis and lupus
guides to the situation of the bacilli.

Other Staining Methods.—Shortly after the publication of Lust
ten's work and independent of it, Doutrelepont and Schütz, in an art
entitled "Bacillen bei Syphilis" (Deutsche med. Wochenschrift, No.
p. 320, 1885), announced that they had demonstrated the presence
bacilli in syphilitic tissue by means of a special staining method, which

form, size, and situation in the tissues corresponded to those described by Lustgarten, and were probably identical with them. Their method of preparing the sections is as follows: The tissues to be examined are cut in small pieces and hardened in absolute alcohol for several days. They are then softened for about ten minutes in water and cut with the freezing microtome. From the microtome the cuts are placed in a one-half-per-cent salt solution, and thereafter each section is carefully spread out in absolute alcohol, where they should remain until the air is expelled from them. The sections are now placed in a one-per-cent solution of gentian-violet for twenty-four or forty-eight hours. In decolorizing, each section is placed for a few seconds in diluted watery solution (one to fifteen) of nitric acid, and from this in sixty-per-cent alcohol, where after five or ten minutes the alcohol is deeply colored by the stain; it should be renewed at least once.

After decolorizing is completed, the cuts have a pale violet tint, and are now placed in a weak, translucent, watery solution of safranin, which should be freshly prepared each time it is used. Within a few minutes the sections are colored intensely red. They are then rapidly washed in sixty-per-cent alcohol, safranin stains are rapidly washed out by alcohol, dehydrated in absolute alcohol for a few seconds, cleared in cedar oil, and examined in Canada balsam by means of a Zeiss one-twelfth immersion lens. In this manner the authors found in two scleroses, two flat condylomata, a papule of the chin, and a gumma, the bacilli stained blue, and the tissues, especially the nuclei, stained pale red.

In a later communication Doutrelepont (Deutsche med. Wochenschrift, No. 47, p. 812, 1885) reported that he had succeeded by means of his method in detecting the bacilli in syphilitic secretions, but not in smegma, although the bacilli in smegma were stained by Lustgarten's method. As a continuation of his former work he had found bacilli in eight scleroses of the prepuce, one of the vulva, one flat condyloma of the vulva, one condyloma about the anus, five syphilitic papules, and in one gumma.

De Giacomi (Neue Färbungsmethode der Syphilisbacillen, Schweizer Correspondenzblatt, 1885, p. 470) succeeded in revealing the bacilli in cover-glass preparations by means of a solution of fuchsin in aniline water heated over an alcohol flame; he used as a decolorizing agent at first a weak then a strong solution of chloride of iron. In this way the bacilli were stained red, while the other micro-organisms were decolorized; methylene blue was used as a contrast stain. The easy application of this method, as well as the short time required, recommend it.

Gottstein (Referat über De Giacomi's Färbung der Syphilisbacillen, Fortschr. der Med., 1885, No. 16, p. 545) applied the same method for coloring sections of syphilitic tissue. After remaining for twenty-four hours in the fuchsin solution they were washed in distilled water, then decolorized in a weak solution of chloride of iron, dehydrated, mounted in the usual manner. The sections should have a pale vi color and the cell nuclei be decolorized. Gottstein found with method in almost every cut examined from two to twelve bacilli, eit singly or in groups; in size and appearance they corresponded to th previously described.

Other micro-organisms, with the exception of the tubercle bacil were decolorized by the chloride of iron; the latter resisted its action a period of twenty-four hours.

In a critical review of the work of De Giacomi and Gottstein, Ba garten (Jahresbericht über die Fortschritte in der Lehre von den pat genen Mikroorganismen, 1885, p. 97) stated that he had readily succee in detecting bacilli in an initial lesion by means of this procedure, w by the Lustgarten method he had searched in vain for organisms.

The specific claims for the bacillus of syphilis received a severe bl when Cornil (Gaz. des Hôpitaux, 1885, No. 90), in a communication the Academy of Medicine of Paris, stated that Alvarez and Tavel found in the smegma taken from a healthy man bacilli which reacted the same manner to aniline dyes, and were in every respect identical w the Lustgarten bacilli.

The complete article by Alvarez and Tavel (Archives de Physiolo October, 1885) contains a critical review of Lustgarten's work, as well the results obtained from the examination of a number of cases of syp litic tissue and secretions, as well as the non-specific products. Th authors obtained a negative result from the examination of five sclero two mucous patches, and a gumma of the lungs, but found the organis in the secretions from chancres, gummata, mucous patches, as well as three cases of soft chancre, out of twelve examined, in the fluid of vesicles of herpes præputialis, and in pemphigus vulgaris. In the smeg taken from the prepuce, from between the large and small lips of vulva, and from the region of the anus, the same bacilli were found id tical in appearance and color reaction with the bacillus of Lustgarten, a very similar to the tubercle bacillus.

The bacilli were stained in two hours with a constant temperature 60° C. With eosin, safranin, and picrocarmine good contrast col were obtained. Oxalic acid was used instead of sulphurous acid w much the same result. In their reaction to acids they showed a gr resemblance to the bacilli of tuberculosis, as they were not decolori by a thirty-three-and-one-third-per-cent solution of nitric acid. Cov glass preparations were stained with good results by means of a so tion of fuchsin in aniline water, decolorized with nitric acid and count stained with methylene blue.

A short time after the appearance of the publication last nam

George Klemperer, at a meeting of the Berlin Medical Society (Deutsche med. Wochenschrift, No. 47, 1885), confirmed in great measure the results attained by the French investigators. He found, however, that the smegma bacillus was much more easily decolorized by acids than the bacillus of tuberculosis. While successful in demonstrating bacilli in the secretions from syphilitic lesions, he failed to find them in the tissue of specific products.

Before the publication of the work of Lustgarten, as well as that of Doutrelepont, Matterstock and Bitter (Mittheil. aus der Klinik der Universität Würzburg, Wiesbaden, 1886, Bergmann) had by means of aniline dyes demonstrated bacilli in initial lesions and in condylomata; they were present in such small numbers that the authors could not look upon them as the cause of the disease. They continued their investigations with the coloring method of Lustgarten and found bacilli in two scleroses, two papules from the leg, seven flat condylomata from the female genitals, and in four gummata from the skin. The same organisms were detected in the secretion from various specific lesions, with the exception of gummata, and of the blood taken during the existence of a roseola syphilitica. They agreed with Alvarez and Tavel in discovering no difference in staining reaction between the smegma and syphilis bacillus, although both resisted the influence of the mineral acids a much shorter time than the bacillus of tuberculosis. They were disposed to assign an etiological *rôle* to the bacilli, in spite of their resemblance in appearance and color reaction to the smegma bacilli.

Bitter (Virchow's Archiv. Bd. cvi, H. 2), under the direction of Matterstock, continued the investigation with especial reference to the color reaction. He found, after staining by Lustgarten's method, that the preparation could not remain for a longer time than thirty seconds in alcohol without losing its color. He also found it necessary to frequently pass the sections through the permanganate of potassium and sulphurous acid before they were entirely decolorized. He furthermore remarks that the question of a differential diagnosis of the tubercle and smegma bacillus could only come into consideration in the examination of urine, as, in secretion removed at a distance from the genital organs, one would not expect to encounter the latter organism.

Zeissl (Wiener med. Presse, 1885, No. 48) examined nine scleroses and one moist papule with a practically negative result, as bacilli were found in only two sections. In the secretion of syphilitic products the result was not always positive.

J. Dissé and K. Taguchi (Tokio) in a preliminary communication (Deutsche med. Wochenschrift, 1885, No. 48), and later in a more detailed account (Deutsche med. Wochenschrift, 1886, No. 14), affirmed that they had encountered a constant form of organism in all syphilitic products, cultivated it, and successfully used the cultures in inoculatio rabbits, who later developed characteristic specific lesions. In the b taken from syphilitic individuals, round spores were encountered the use of Gram's staining method, and in cultures obtained from blood they found several distinct bacilli. A bacillus identical with of the forms detected in the cultures was also found in the secret from chancres and flat condylomata, and in the blood and urine of mals inoculated with these cultures.

It is manifest from the claims of these authors that they were by a well-known and comparatively easy coloring method to reveal presence of organisms which had escaped other skilled observers, their cultures were obtained without especial precautions, and that succeeded in producing in animals specific lesions.

In opposition to the claims set up by Dissé and Taguchi to have ceeded in infecting rabbits, it may be said that the initial lesion wa sent, that pathological changes in the internal organs appeared in a tively short time after the infection, and, furthermore, that organs found affected in these animals which are seldom found diseased in It is probable that all these changes can be referred to septic or infection, and not to the influence of syphilis. The organisms descr by these writers were subsequently found in the blood of healthy viduals by Steingiesser, working under Lassar's direction, and from tures made with such blood rabbits were inoculated. Although numbers of organisms were found in the blood of such inoculated rab no change took place in their appearance or behavior.

Eve and Lingard (On a Bacillus cultivated from the Blood and Diseased Tissues in Syphilis; The Lancet, No. xv, 1886, vol. i) lieve, as a result of their successful examination of initial lesions, s litic buboes, condylomata, for bacilli, as well as from cultures obta from blood and syphilitic secretions, that they have discovered the cause of the affection. Their bacillus is about the size and shape of of tuberculosis. It was found abundantly on the line between the he and diseased tissue in scleroses, seldom in the granulation tissu ulcers. They encountered it in lymph glands, partly within and p without the cells, in condylomata, both on the surface and in the cor and in gummata of the skin at the line of infiltration when the pr was extending. The best staining method was a solution of Hum red in aniline oil and decolorizing in alcohol. Gram's method was successful, though the bacilli were decolorized by acids as also by garten's method. Successful cultures were obtained upon blood se agar-agar, and hydrocele fluid. Attempts to inoculate animals failed

Further investigations have been made regarding the bacterial o of syphilis by Markuse (Vierteljahresschrift f. Dermat. u. Syph., 1 who obtained a positive result in ten of twenty-three chancres examined, and in forty-three of fifty-seven anal condylomata. From a number of experiments, he concluded that the smegma bacillus resisted the action of acids for a considerably longer time than the syphilis bacillus.

Andromico, Haberkorn, Marcus, Manssurow, Leloir, Babes, Königer, and others describe organisms from the blood and secretions of syphilitic subjects to which more or less etiological importance has been assigned.

The writer of this paper, in the laboratory of Dr. Lassar, of Berlin (Inaugural Dissertation, Universität zu Berlin, 1888), repeated many of the staining methods previously mentioned, notably those of Lustgarten and Doutrelepont, and was successful in obtaining positive results in two scleroses and one flat condyloma out of a number examined by these methods. He was more successful in demonstrating bacilli in specific lesions by a coloring method which had been devised by Kühne a short time previously (Ueber ein combinirtes Universalverfahren Spaltpilze im thierischen Gewebe Nachzuweisen; Unna's Dermatologische Studien, Heft 2). A flat condyloma stained in this manner contained bacilli in almost every section examined; in one section a group of twenty bacilli were found in the subcutaneous cell infiltration, crossed, parallel, and arranged in chains of twos and threes. In sections from pointed condylomata examined in the same manner no bacilli were encountered, but numerous cocci on their surface.

From the foregoing it will be seen that, although the results obtained were not uniform nor always of a positive character, the presence of bacilli in syphilitic tissue can not be doubted. Their small number in such highly infectious lesions as chancres and mucous patches speaks against their etiological relationship to the disease unless the coloring methods are at fault. It is possible, as suggested by Lustgarten, that the bacilli are only capable of taking up the stain during a short period of their existence. As a rule, the spores of all micro-organisms take the aniline dyes with difficulty, if at all; and it is known that in certain tubercular lesions their specific nature can only be demonstrated positively by cultures and inoculation experiments. In the case of syphilis, a disease confined to the human race, we would scarcely expect to succeed in growing the microbe upon artificial media when animals prove refractory to inoculation attempts.

Although so many important conditions are lacking to prove that syphilis is caused by the bacillus of Lustgarten, it is the opinion of many competent syphilographers that, owing to its presence in all syphilitic lesions, especially those at a distance from the genitals, it must have some etiological connection with this disease in spite of its close resemblance to the bacillus of smegma. Baumgarten, who is opposed to ascribing much importance to the presence of the bacillus in the lesions of internal organs, is inclined to identify it with the bacillus of tuberculosis ra than with the smegma bacillus. Some additional support is given to view of Baumgarten's by the recent work of Sabouraud (Quelque relatifs à la méthode de coloration de Lustgarten, Annales de l'Ins Pasteur, Mars, 1892, p. 184), who found the coloring method of garten a very excellent way to stain tubercle bacilli. Bacilli were dete in a lesion at first looked upon as a gumma, but its tubercular nature determined by inoculations of animals. It is known that syphilis is infrequently responsible for the development of a latent tuberculosis, it is possible that many apparently healthy individuals carry with t more or less tubercle bacilli which are stimulated to development by syphilitic poison, and constitute a source of confusion in our stai methods.

This latter view is upheld by the late work of Pizzini (Zeitschr. klin. Med., Bd. xxi, No. 329), who succeeded in producing tuberculos guinea-pigs by inoculating them with lymph glands from persons had died of acute diseases, but without evidence of tuberculosis.

The points of similarity which exist between syphilis and the acut anthemata have already been referred to. The failure to demonstrat essential nature of the contagion of these affections has led Koch t opinion that perhaps not a bacterium, but a protozoön, was respon for their production.

Last year (1892), Daehle (Centralbl. f. Bakt., Bd. xii, No. 25) clai to have demonstrated in the blood of cases of variola, measles, and sc tina, in the pustules of variola, and in various syphilitic secretions, par protozoa, probably in the case of the acute exanthemata allied in sp He has not determined the special group of protozoa to which the pr organisms belong. They have the form of flagellate balls of various one to two and a half microns in the case of the acute affections, and a to four microns in the case of syphilis ; they possess active movemen changes of shape.

Daehle states that he has been able to cultivate the organisms f in scarlatina and variola, and promised more details in a later com cation.

The growing importance at present assigned to the existence of tozoa in malignant growths and in certain cutaneous affections, tog with the great activity in this field of research, renders it probabl the future will clear up many obscure points in the etiology of ce affections in which the better known vegetable organisms have not found.

Secondary Infection of Syphilitic Lesions with Pyog Organisms.—Kassowitz and Hochsinger, in 1886 (Wiener med. Bl 1886, Nos. 1–4), by a modification of Gram's method, discovered co pemphigus bullæ, the bones, liver, pancreas, and lungs of children who had died with hereditary syphilis. These cocci were present in organs with microscopic or macroscopic syphilitic lesions, and not in non-syphilitic children. The authors, while not claiming that these microbes were the cause of syphilis, were yet inclined to attribute to them an etiological importance.

Kolisko (Wiener med. Blätter, 1886, No. 5), in repeating the examination made by the last-named writers, admitted that the cocci were often found. He obtained in one case a pure culture of the streptococcus pyogenes from blood taken from the liver. This writer believed the organisms in question gained an entrance into the circulation through the skin lesions, and, while attributing to them no importance in the production of the disease, thought the fatal termination in many cases of hereditary syphilis depended upon the septic influence of these microbes.

Chotzen (Vierteljahr. für Dermat. u. Syph., 1887, p. 109) expressed a similar opinion, and was inclined to believe that the presence of the streptococcus was accidental, and not at all an essential condition of hereditary syphilis. Its presence in the epiphyseal extremities of the long bones in children led him to believe that the frequent occurrence of lesions in these localities might be explained by this fact.

Doutrelepont (Centralblatt f. Bact. u. Parasitenkunde, B. ii, No. 13) agrees in the main with Kolisko and Chotzen regarding the nature of the streptococcus. He has found it in papular skin eruptions, and thinks it may gain entrance into the general circulation through these lesions. He would attribute the suppuration in bones and other organs met with in children with hereditary syphilis to a secondary infection from this organism.

The writer of this paper has examined skin lesions, the umbilical cord, and sections from the liver of children in whom death resulted from hereditary syphilis, and has easily demonstrated the presence in large numbers of pyogenic micrococci. He is disposed to believe that secondary infection by these organisms plays an important *rôle* in many complications of the hereditary affection, and determines in certain instances the fatal result.

As the specific lesions in acquired syphilis seldom suppurate, many modern writers believe that the exceptional occurrence of suppuration is determined not so much by the direct action of the virus of syphilis as by a secondary or mixed infection with pyogenic germs which are incited into activity by the impairment in the integrity of the tissues through the specific lesions.

The fact that gummata of the skin and subcutaneous tissue suppurate much more frequently than similar lesions in internal organs; that pustular lesions are seen more often among those in the lower walks of life

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where less attention is paid to personal cleanliness, and on the scalp hairy regions of the body where pyogenic germs find a more perma lodging place, are additional arguments in favor of the admixture of pus-producing organisms with the specific poison of the disease. A m intimate knowledge of the microbe causing the disease, together with action of its ptomaine, may alter our views in regard to the caus suppuration in syphilis.

As secondary and mixed infections play so important a *rôle* in ot infectious diseases, it would be exceptional where so many foci of abs tion and infection are afforded as in syphilis, should all the sequences the disease be due to a single germ.

The presence of pyogenic cocci below the healthy epidermis, as sho by Welch and others, renders the theory of secondary infection in m specific lesions extremely probable. The simultaneous outbreak o pustular syphilide over the entire body speaks against the theory o local infection of the specific lesions, and rather in favor of a poison the general circulation.

It is known that suppuration may be excited by a variety of bact and by their filtered soluble products, and that the same organism un different conditions undergoes modifications which greatly alters its pat genic power. Cultures of streptococci vary in virulency according to source from which they are derived, and the bacillus of tubercul produces cutaneous lesions and lesions of the mucous membranes, wh are distinct in their clinical appearances and subsequent course. tuberculosis of the mucous membrane of the mouth or throat inocula by the bacilli in the sputum is clinically a different affection from slowly progressing lupus of the same locality or of the skin, though ascribe both to a common cause.

In the one instance we suppose that the bacillus, direct from acti disease of the lungs, contains its chemical poison in a more concentrat form than the same organism in lupous tissue; just as streptococci fr the fluid in a septic peritonitis are infinitely more virulent than the sa organism found in acne pustules.

It may then be assumed that the toxine which we must believe to associated with the micro-organism causing syphilis has, in these cases early pustular and ulcerative lesions—the so-called malignant precocio syphilides—acquired an increased virulence capable in itself of produci suppuration or of inciting into activity the pyogenic organisms normal inhabiting the epidermis.

It is possible that the union of various bacteria in the initial lesi may generate a more virulent form of toxine than a single variety.

Undoubtedly predisposition, the quality of the soil, a partially a quired immunity, may influence the intensity of the manifestations the disease; but we can scarcely explain all its manifestations on these assumptions.

The growing importance assigned to the waste products of bacteria in the production of many of the phenomena of the infectious diseases has led Finger (Archiv für Dermat. u. Syphilis, p. 331, 1890) and others to the belief that in syphilis certain manifestations may be assigned to the direct action of the microbes themselves; while others depend upon the action of a toxalbumen generated by the specific bacilli.

The differences presented in the clinical behavior of the early and late syphilitic manifestations, together with the unequal reaction of the lesions of the different stages to therapeutic measures; the immunity acquired by mothers who bear syphilitic children from the father, and of children born healthy and remaining so of syphilitic mothers, are facts which point strongly to the view that we have to do with complicated factors in the etiology of this disease.

Until, however, we become more intimately acquainted with the life history of the micro-organism which causes syphilis, and can separate in an experimental way the effects produced by the germ itself and those resulting from its chemical poison, we are obliged to apply the pathological laws governing other infectious diseases in explaining the phenomena of syphilis.

In Finger's article (*loc. cit.*), which is of course founded upon hypothesis and analogous reasoning, he points out the effects which we may assume to be due to the action of the micro-organism itself and those produced by its chemical product.

The initial lesion with the involvement of the neighboring lymph glands he considers to contain both the specific germ and its ptomaine. The latter, absorbed into the general circulation from early date, produces the immunity which syphilitic infected persons usually present from an early period and long before the outbreak of secondary eruptions.

The fever, anæmia, loss of strength, passing icterus, albuminuria, the pains in the muscles, joints, and bones, the loss of hair, and lusterless and brittle condition of the nails met with in the primary and secondary stages of the disease, are to be referred to a progressive intoxication from the chemical products generated in the initial lesion and lymph-glands, rather than to the direct irritating action of a living germ.

Secondary Syphilis.—The secondary eruption, containing in a highly active state the contagious principle, must be regarded as the direct product of the micro-organism alone or combined with its toxine. Certain cases are characterized by intense disturbance in the general health, with slight eruptive manifestations.

In these patients we may conceive that a more poisonous toxine is produced, or a less tolerant condition of the tissues is present.

The facts which we have gained regarding the establishment immunity in infectious diseases have rendered it pretty clear that s immunity depends upon an acquired tolerance to the toxic product pathogenic bacteria. A complete or partial immunity results fro single attack of the acquired disease.

Mothers who bear syphilitic children from latent syphilitic fat escape the disease entirely, or pass through a modified form of it (Co Baumès law). Children born from mothers infected directly du pregnancy as a rule are born healthy, and remain during life prote against the disease (Profeta's law).

Although it is not impossible, as at one time supposed, for mi organisms to pass from the fœtus into the maternal circulation, and *versa*, it is probably true that the passage of the crystalloid toxines, g erated by the development of the specific microbes in slowly increa quantities, is responsible for the production of the immunity of mother in the one case and of the child in the other.

Some writers have attempted to explain the fact that syphilitic c dren are not infrequently born without evidences of the disease, but l show marked impairment in their general health, develop an erupt or other evidences of the affection, on the supposition that during in uterine life the toxines are escaping by osmosis into the maternal circ tion, and are not stored up in the fœtal tissues. At birth an accum tion of these poisonous bodies takes place, which soon produces cha teristic effects in the delicate organism of the child.

When syphilis is present in the mother as well as in the child course the elimination of toxines would be markedly prevented, a death of the *fœtus in utero* would be likely to occur, or the child be b with the disease fully developed.

These hypotheses serve to explain the phenomena of the acquired well as the hereditary form of the disease, and have in their supp much experimental evidence connected with the inoculation of anim with the infectious diseases.

Tertiary Syphilis.—Finger (*loc. cit.*) believes that the late manife tion of syphilis, like the immunity conferred by the disease, is the res of the action of the toxines. His reasons for this belief are: The exc tional occurrence of tertiary manifestations, their late appearance af infection, their different clinical appearances and course, the fact t they are neither contagious nor transmitted by inheritance, and that this stage reinfection is possible; the essentially different results obtain in the early and late lesions from the administration of the iodid finally, that, like immunity, individuals may present tertiary lesions w have passed through neither the primary nor secondary stages of t malady.

This last proposition is illustrated in the mothers who bear children from syphilitic fathers. While they are not inoculated by the active contagious lesions which their children may present, it is not unusual later in their lives for them to develop a cachexia or tertiary lesion.

Predisposing Causes.—Independent of the virulency or attenuation of the virus of syphilis in the production of a severe or mild type of the disease, the *resisting power of the individual* upon whom the poison is inoculated probably plays a no less important *rôle* in its future evolution.

All conditions producing constitutional weakness, such as acute or chronic diseases, the extremes of life—youth and old age—tuberculosis, malaria, alcoholism, etc., render it probable that the disease will pursue a severer course.

The presence of *tuberculosis*, while in itself predisposing to a graver form of syphilis, prevents in a measure the use of mercury, and thus deprives us of our most useful therapeutic agent.

Syphilis not infrequently develops a latent tuberculosis of the lymph-glands or of the lungs in individuals apparently in good health before their infection.

Malaria.—The cachexia resulting from a prolonged residence in a malarious locality has sufficed to cause an outbreak of the inactive syphilis. The well-known influence of *chronic alcoholism* in increasing the vulnerability of the tissues in all infectious diseases seems to be intensified in syphilis, for it is generally accepted that the prognosis in such individuals is much more grave than in temperate persons. Whether by increasing the vascularity of the parts a more favorable soil is furnished for the growth of the disease germs, or, by the conjoint action of both agents upon the lining membrane of the blood-vessels, for which they have a predilection, a more rapid and serious pathological effect is produced, are questions which, in our present knowledge, can only be answered in a general way.

Localization.—Syphilis in some instances displays a preference for certain tissues, in one case confining its manifestations to the skin, in another to the osseous system, and in a third implicating the nervous centers alone.

Chance seems, in the great majority of instances, to govern the situation of syphilitic lesions; while, again, prolonged irritation, injuries to certain organs, or the *locus minoris resistentiæ*, may be invoked to explain their location.

The occurrence of late lesions at the sites of the early eruptions would point to a persistence of the virus in one locality. Neumann's histological examination, showing pathological changes in tissues formerly the seat of the eruption, but macroscopically normal, would lend support to this view.

The influence of heredity, with mental overwork and worry,
been offered by certain French writers as potent factors in rendering
nervous centers more susceptible to the disease. This explanation w
seem to have some weight, in view of the fact that general paralys
the insane occurs among those individuals exposed to much mental w
and that seventy-five per cent of such patients have had syphilis.

Improper or imperfectly carried-out treatment during the early
of the disease is the most frequent cause of the occurrence of ter
symptoms, as shown by the statistics of Haslund and others; while
causes before mentioned apply to the minority of cases only.

Immunity through Syphilization.—Aside from the factors whic
fluence the severity of the syphilitic infection in a general way, an att
has been made to explain the occurrence of malignant syphilis by
posing that the virus inoculated on such individuals is more virulen
has been imported from another latitude or race. This explanation
not always hold good, however, as observations have been made w
show that malignant syphilis when transferred to others pursues an
nary benign course.

Taking into consideration the fact that infectious and contagiou
eases show a tendency to grow milder after existing for a time in a
munity, the occasional outbreak of the malignant type of the diseas
been explained by supposing that its victim belongs to a family whic
not acquired a partial immunity through the syphilization of any
members.

When we compare the milder course of the affection to-day wit
severe epidemic at the end of the fifteenth century, this explanation v
seem to possess some other merit than hypothesis pure and simple.

SOURCES AND VEHICLES OF THE SYPHILITIC CONTAGION.

Unlike the virus of the acute contagious diseases, the poison of s
lis adheres closely to the specific lesions or infected objects, and rec
an intimate contact with an abraded surface or delicate mucous memb
to gain an entrance into the tissues.

It has been recognized for a long time that the *initial sclerosis*
tains the syphilitic poison, and that it can be conveyed to the he
both by direct or mediate contact, as well as by experimental inocula

The opinions in regard to the infectious nature of the *secon*
lesions and the blood at this period of the disease were at one time n
unanimous. Both Hunter and Ricord, as the result of theoretical
siderations and experiments, denied the infectiousness of all syph
products excepting the initial lesion. The fallacy of their conclu
however, depended upon the fact that their inoculations were made
patients who were already syphilitic, and not upon healthy subjects.

Wallace, of Dublin, in 1835, first showed that the secretion from *syphilitic pustules* could produce the disease by inoculation, and alluded to the successful experiments with the secretion from flat condylomata made by another investigator.

Waller, of Prague, in 1851, inoculated the secretion from a *flat condyloma* upon the thigh of a boy, and produced, after twenty-five days, typical initial lesions, followed after due time by a secondary eruption.

Experiments with identical results have since been made by Vidal, Rinecker, Hebra, Rosner, and a host of others, proving the contagiousness of the products of the early syphilitic lesions which the confrontations of Bassereau, Diday, Fournier, Clerc, and others, together with numerous further experiments and observations have confirmed, so that now it is well established that all syphilitic forms belonging to the early period of the disease, especially their secretions, can communicate the affection. The secretion from the abraded condylomata lata which are present about the female genitals is believed to be the most frequent source of syphilitic infection. Successful inoculations with the *blood* of patients with active secondary syphilis have been made by Waller, the anonymous physician of the Palatinate—who applied such blood to patients with ulcers of the leg and caused constitutional infection in three instances without reaction at the point of inoculation—also by Diday, Von Lindwurm, and Pellizzari. In Von Lindwurm's experiment the blood was injected beneath the skin by means of a Pravaz's syringe, and caused four weeks afterward an indurated sore at the point of injection, which was later followed by the usual signs of constitutional infection.

As, in the instances quoted, the blood was taken from patients in the early eruptive period of the disease, it is not yet established whether the poison is present in the blood of individuals with latent syphilis—that is, in the intermediate periods between the outbreaks on the surface. It is the opinion of Finger and others that the blood at such times is free from the virus, and that it may again be present during the relapses of the disease. There is nothing irrational in this view, when we remember that in relapsing fever the spirillum is constantly present in the blood during the fever, and absent in the intervals.

Physiological Secretions.—It is generally asserted that the physiological secretions—milk, saliva, perspiration, tears, and urine—from syphilitic persons do not contain the virus, or in such a diluted form that infection from them is not possible. We now know that the micro-organisms of various infectious diseases may pass through the glandular epithelium and appear in the saliva, milk, urine, etc., so that the possibility of transmitting syphilis by such secretions is not absolutely excluded.

Zeissl has observed the development of condylomata upon the lips of infants nursed by women with latent syphilis. Voss claimed to produce the disease in one instance by the subcutaneous injection of *milk;* Mansserow (1887) believes that the milk of latent syphilitic nurses be infectious.

Many instances are, however, on record in which nurses with l syphilis suckled healthy children without infecting them. The w of evidence is against the infectiousness of such milk, although the bility of it should not be lost sight of. Tarnowsky quotes from Be case where a healthy mother nursed her own child for a numb months. By chance she suckled another child with mucous patches mouth. After eight days her own child presented a chancre, follow constitutional syphilis. The mother during the entire time rem healthy. Accidental inoculation of the disease occurs so frequentl too much care can not be exercised in drawing conclusions regardin source of the infection.

Experimental inoculations of *semen* from syphilitic persons o healthy have given only a negative result. It has been claimed t syphilitic man can infect his wife without conception through the action of the spermatic fluid. It is the general belief that such inf can not take place unless the semen be mixed with syphilitic virus the urethra. The hereditary transmission of the disease from the f to the child by means of the semen, without a previous infection c mother, is generally admitted. In such instances, however, the inf of the ovum by the spermatozoön is quite a different process from cial inoculations, and can not be compared to them.

The transmission of syphilis from the mother to the child by of the *infected ovum* is also an established fact. In this case an which has imbibed the poison from the maternal organism is impreg with healthy semen.

Whereas the capability of transmitting the disease on the side c father ceases within two to four years as a rule, with the mother thi sibility continues for a longer time.

Pathological Secretions.—Regarding the infectious property of logical secretions not properly belonging to syphilis, it is generally that the disease can not be conveyed by them unless they are mixe the patient's blood or disintegrated portions of specific lesions. inoculated pus from an acne pustule on a syphilitic individual pro by iodide of potassium with a negative result. A like result was ob after the inoculation of serum from a case of eczema taken from a p with syphilis.

Gonorrhœa or chancroid contracted from a person having at the time syphilis, is, as a rule, followed by no constitutional infection.

Berkeley Hill, and Marston are of the opinion that blennorrhag charges may infect with syphilis. Tarnowsky made eighteen inocul with gonorrhœal pus from the genitals of syphilitic patients, with one positive result only.

It should be borne in mind that with the outbreak of early secondary syphilis a slight urethral or vaginal discharge may occur, due to the presence of local lesions, or as a part of the general congestion of the mucous membranes, capable in itself of conveying the disease.

In vaccinal syphilis, the view generally held is that when pure lymph is inoculated with no admixture of blood vaccinia alone is transmitted, and no syphilis.

In the instances of claimed inoculation with pure lymph taken from a vaccine vesicle on a syphilitic person, the possibility of a contamination with blood-corpuscles was not excluded by a microscopic examination.

Experimental inoculations made with the secretions from *tertiary lesions* on healthy subjects have invariably given negative results. Diday made sixteen inoculations with blood from patients with late syphilis without conveying the disease.

Finger inoculated the secretion from gummata of the skin, late ulcerations of the mucous membranes, and from patients with periostitis, thirty times on ten healthy subjects, with no positive results.

It is yet an open question whether the secretion from the precocious ulcerating lesions is infectious.

The result of the inoculation experiments is in accordance with everyday experience which teaches us that the late lesions are, as a rule, neither inoculable nor transmitted by inheritance, and that such patients may acquire a syphilitic reinfection. The views regarding the infectiousness of the late lesions of syphilis must not be taken too absolutely, as a number of good observers have reported instances both of inoculation and hereditary transmission of tertiary syphilis.

As at one time the infectiousness of the secondary lesions of syphilis was strongly denied, a wider experience and more careful observation may to some extent alter our views regarding the infectious character of the tertiary products. At the meeting of the International Congress of Dermatology and Syphilography held at Paris in 1889, Landouzy read a paper in which he related two instances where recently married husbands infected their wives lông after the secondary period of the disease had passed. In one case the husband had a gummatous lesion on the penis, the diagnosis of which had been confirmed by Fournier. His wife, a few months after marriage, developed a syphilitic roseola preceded by inguinal adenopathies.

In the other case four years had elapsed since the appearance of the initial lesion on the husband. He had been repeatedly treated with mercury and iodide of potassium, and when married had no evidence of the disease either on the skin or mucous membranes. Several weeks after marriage, however, his wife developed a chancre of the vulva, foll by the usual evidences of constitutional infection.

In the discussion which followed the reading of this paper a nu of gentlemen present recalled similar instances.

Hardy expressed the belief, founded on the observation of two that syphilis might be transmitted independent of all outward signs c disease.

Fournier related a case in which a husband infected his wife fi years after he contracted the disease. At the time the patient su from pulmonary syphilis, together with a sclerotic glossitis. The developed a chancre of the lip, which was followed by a secondary We must in all such cases remember the possibility of some other s of contagion.

SYPHILIS IN ANIMALS.

The remarkable progress made in the study of tuberculosis has owing to the susceptibility which animals show to that affection. U tunately for the scientific study of the etiology of syphilis—a d even more infectious than tuberculosis—our investigations are sad peded by the immunity which animals of all classes have shown t disease.

Hunter made the first attempt to inoculate animals with the ve diseases, and mentions inserting lint saturated with pus from gonor chancre, and buboes, into the vaginas of dogs and asses.

These efforts to communicate the venereal diseases to animals, a as subsequent experiments in a like direction by Ricord, were w result.

In 1844, Auzias-Turenne claimed to have infected a monkey syphilis. As he was a unicist of the first order, the lesion produce probably a pustule, regarded by him as an evidence of syphilis.

The same investigator inoculated a cat with syphilis, and des certain general manifestations of constitutional infection aside fro local lesion.

The results were not accepted in his own day as positive, as tl periments were not carried out with scientific accuracy.

In 1871, S. Messenger Bradley reported at a meeting of the I Medical Association that after a number of attempts at inoculatin mals which had been without result or produced soft sores only, l successfully infected a guinea pig and young kitten with the disease

"The inoculation was followed, in from two to three weeks, by thickening at the point of inoculation, and afterward by constitu syphilis. The guinea pig died within one month from the commenc of the induration, with destruction of one eye, and extensive destr of the mouth and soft palate. I killed the kitten at the end of the eighth week, and found syphilitic gummata in the kidneys and liver."

In these cases, which seem somewhat plausible, the results have been accepted by some writers on syphilis as proving the possibility of infecting the lower animals.

In neither of the cases, however, was the probability of a tubercular or septic infection excluded.

In 1874, Legros inserted a piece of indurated chancre under the skin of a guinea pig. After a time an ulcer with an indurated base developed.

During the healing of the wound the animal died, and at the autopsy the lymphatic glands and liver were found enlarged. Small tumors were present in the substance of the liver, together with cicatrices upon its surface. A small yellow nodule, the size of a pea, was found in one epididymis.

In view of the predisposition of guinea pigs to tubercular infection, there can be little doubt that Legros's case was of that nature. We would not expect to find such lesions in syphilis at so early a date after infection.

In 1882, Martineau and Hamonic inoculated a monkey on the penis with the secretion from a true chancre. After twenty-eight days two indurated nodules appeared on the prepuce, followed by an enlargement of a lymphatic gland in the left groin. The sores healed, but a general adenopathy, papulo-erosive lesions on the prepuce, ulcerative lesion of the soft palate, and papular eruption on the scrotum developed.

Subsequently the animal became quite well.

The development of the affection in this case certainly suggests a successful syphilitic inoculation.

Köbner (Wien med. Wochenschrift, 1883, p. 898) discussed at length the question of conveying syphilis to the lower animals, and recalled certain experiments made by himself in 1861 in the laboratory of Claude Bernard.

He inoculated rabbits and dogs in the cornea with the secretion of mucous patches. He injected in the veins of the animals the same secretion, the fluid expressed from chancres freshly extirpated, and by other methods endeavored to convey the disease. Neither local nor constitutional infection was produced.

Neumann, in 1883, inoculated a large number of animals, including three monkeys and two horses, but failed in every instance to reproduce the disease.

Horand and Cornevin were equally unsuccessful in their attempts to inoculate pigs.

Cognard claimed to have successfully reproduced syphilis in a monkey. In discussing his communication, Dron and Horand believed the monkey to be affected with a form of septicæmia, as the animal came ill after the inoculation and developed an ecthymatous eruption.

The strong probability that many of the lesions following inocula of syphilitic matter in animals were tubercular, is strengthened by experiments of Vittone in 1884, who demonstrated the bacillus of tu culosis in lesions of the eye, lungs, and peritonæum following the inoc tion of syphilitic secretions beneath the conjunctiva of rabbits and o animals.

Although we can not absolutely deny the possibility under favor conditions of infecting the lower animals with syphilis, the attempts t far made are not encouraging, and the results, even in the apparently cessful instances, should be accepted with the greatest reserve.

The future work in the etiology of syphilis must be directed to de ing some staining method which will reveal the constant presence of micro-organism in the products of the disease, and a culture medi upon which it will grow. When these conditions are complied w opportunities may be afforded for inoculations which will conclusi demonstrate its etiological relationship to the disease.

MODES OF INFECTION IN SYPHILIS.

By L. DUNCAN BULKLEY, M. D.

Syphilis is communicated from one individual to another by the transference of the virus or contagious element peculiar to the disease. It can never arise *de novo*, but in every instance is propagated in a definite manner, which could always be determined if all the facts relating to each case were known and correctly observed. It is never acquired in any occult manner—by the breath, or by mere proximity to an affected individual—unless there has been an actual transference and absorption of the contagious element of the disease.

There are four methods by which syphilis can be acquired: 1. Direct Contact. 2. Mediate infection. 3. Hereditary transmission. 4. Maternal infection. It is not believed that the normal secretions—milk, saliva, etc.—can communicate the disease, except when they act as carriers of a pathological secretion from a syphilitic lesion.

For the entrance of the syphilitic poison through the skin or mucous membrane, either by direct contact or by mediate infection, there must be a solution of continuity of the epithelial covering, the broken or abraded surface occurring either at the time of infection or previously; at the site where this entrance of the poison takes place there occurs a chancre, primary lesion, or local lesion of syphilis, which is described in another chapter. In hereditary transmission and maternal infection the poison is conveyed by the semen, and in the latter instance enters through the uterine walls, and no primary local lesion is known to occur.

I. **Direct Contact.**—By far the greatest number of instances of syphilitic infection occur from direct contact, and of these altogether the largest proportion come from *direct venereal contact* in the genital region. The explanation of this is readily found in the delicate character of the mucous membranes of the parts, and the frequent abrasions which occur during coitus, together with those arising from herpes, eczema, or other conditions; the absorption is specially favored by prolonged contact, and heat and moisture. Venereal infection also takes place not infrequently by unnatural practices, giving rise to chancres of the anus, beneath the breasts, and also in the mouth, on the tongue, lips, tonsils, etc.

But in addition to *venereal contact of the sexual organs* there a large number of occasions wherein the syphilitic poison is transmi directly; these may conveniently be studied under, (1) buccal contact, manual contact, and, (3) corporeal contact.

1. **Buccal Contact.**—*Kissing* stands pre-eminent among the meth of infection, and very large numbers of cases occur from this cause. only does this happen from the more or less lascivious kiss of those ing sexual relations, but chancres of the lip are found from this caus ordinary social and family life, and even very young children are o sionally infected thereby.

Biting furnishes a considerable number of cases, and accidental t wounds often give rise to infection; these lesions commonly o about the face, also on the hands.

Sucking has in times past been the source of many cases of sy lis, when the practice of breast-drawing by the mouth was common, professional breast-drawer becoming infected and then giving syphili many others in the same manner. A number of small epidemics ar record from this source. The sucking of a wound by a friend ha like manner communicated the disease in several instances on rec Also in ritual circumcision syphilis has repeatedly been communic by the practice of putting the penis in the mouth for the purpos stanching the blood.

2. **Manual Contact.**—Syphilis is not infrequently acquired thro manual contact, which may be considered under the aspect of (1) pr sional and (2) social.

(1) *Professional Infection.*—Surgeons have been inoculated, bot operations and in necropsies upon syphilitics; dentists have also rece chancre of the finger from various operations on the mouths of syphi patients; accoucheurs and midwives have in large numbers been fected in their callings, the poison most commonly entering on the or second finger, through abrasions, or very frequently by the side of nail. Medical men, and even students, have repeatedly been syphil in examining syphilitic lesions, most commonly chancres. Not ir quently the poison is carried elsewhere by the finger, and chancre the eyelid, nose, and other places have been thus caused.

(2) *Social Infection.*—Manual infection in social life is not ir quently of venereal origin, and a case is on record of a chancre of great toe from contact with the female genitals. Scratches by syphi persons have been reported as giving rise to a chancre, and also pinch although it is more probable that infection took place from subseq inoculation with buccal secretions. Several cases are on record w policemen have received chancres on the hand from tooth injur making arrests.

3. **Corporeal Contact.**—In addition to chancres about the abdomen, hips, and thighs, received in connection with venereal acts, there are a number of authentic cases where individuals were infected innocently during *contact in sleep* with syphilitics. This has been especially the case with infants and young children. There have also been many cases where infection has occurred from carrying and supporting syphilitics.

II. **Mediate Contact.**—The instances and methods of acquiring syphilis by means of some intermediate object are most numerous, and space allows of but the briefest mention of some of the principal features pertaining thereto. The subject may be considered as it occurs in (1) domestic and social life, (2) in industrial life, and (3) in professional life.

1. **Infection in Domestic and Social Life.**—All the objects which may come in contact with the secretions, of the mouth principally, may be the means of transferring the syphilitic poison from one person to another. This mode of infection may be conveniently considered as related to, (1) eating and drinking, (2) household effects, and (3) the care of children.

(1) *Eating and drinking.* Cups, glasses, spoons, knives and forks, etc., have in many instances conveyed the poison. It is very difficult to trace accurately the infection in many of the cases recorded, but there is no question that these have, especially in peasant communities, and on occasions of intimate relationship, as on shipboard and in the camp, served as a frequent means of transmitting the disease.

(2) *Household effects, etc.* Towels, handkerchiefs, pillows, underclothing, as also toothbrushes, masks, plasters, bandages, etc., have all been the agents in conveying the poison; tobacco-pipes have given rise to very many cases of syphilis, and the virus has likewise been received from cigars and cigarettes; also troches and candy passed from mouth to mouth have given rise to infection. Privy-seats, commonly supposed to be a fruitful source of contagion, have very rarely been known to communicate syphilis. Syringes used in common have given rise to infection.

(3) *The care of children.* The transmission of syphilis between nurses and children is a well-recognized and frequently observed fact; many of the cases come by direct contact, and belong to the preceding section, but its occurrence is also not infrequent by mediate infection. Nursing-bottles are perhaps the most frequent instruments of contagion, and many instances of chancres of the lip or throat, both in attendants and children, are on record as coming from this source; artificial teats, cups and spoons, etc., may also convey the poison. The human nipple has likewise served as a medium of conveying the virus left on it by one child to another. Children have also been infected by diapers, sponges, cradle coverings, and syringes.

2. **Infection in Industrial Life.**—Certain occupations have favored t spread of syphilis, notably that of glass-blowing, where the passing the blowing-tube from mouth to mouth has infected many from time time. Infection has also occurred from the assayer's blowpipe, fro musical wind instruments, from whistles, and from a speaking-tub Cooks have acquired syphilis from a tasting-spoon, upholsterers fro tack-nails held in the mouth after being in the mouth of a syphiliti also a shoemaker from pegs used in the same manner. Clerks and othe have been syphilized from pencils or objects held in the lips, and som furriers by thread passed through the lips in common. Laundresses ha been infected from the clothing of syphilitics, and handlers of old cloth and rags have acquired the disease from this source.

3. **Professional Life.**—In addition to the professional infection alread referred to by direct contact, where physicians and others have them selves acquired syphilis, there are numberless cases on record where th disease has been communicated through mediate infection. Space fo bids a full consideration of all the various modes of infection whic have been recorded, but we may consider some of the most promine of them.

Vaccination. The chief source of vaccinal syphilis is in virus take from one suffering from syphilis which in some manner conveys also th specific poison of the disease; it is not believed that the absolutely pur vaccine lymph of the eighth day can communicate the disease, but tha there must be an admixture of blood, pus, or some other element from the syphilitic person, in addition to the pure lymph. This may occu from the serum which oozes from the vesicle after the first portion clear lymph peculiar to vaccinia has been taken, when the surface urged by pressure to yield more than the normal amount. Cases are als on record where syphilis has been conveyed in vaccination by the use a lancet soiled with the blood of a syphilitic. Infection may likewis take place from the uncleanly habit of moistening the vaccine point wit the saliva, and also from dressings which may subsequently be placed o the wound.

Tattooing. Syphilis has been repeatedly conveyed by this process and many cases have been traced directly to the operator, who wet th needles or the pigment with his saliva, the mouth being found to be ful of mucous patches.

Phlebotomy has given rise to syphilis in several instances, a chancr forming in the site of the wound in the vein, presumably from a lance infected from a syphilitic.

Circumcision. In certain cases infection has taken place from th dressings applied after circumcision, as Hutchinson has shown, the lin being contaminated by blood from the severed prepuce of a forme infant, which had been placed in the same box. Infection may also arise in still other ways, in addition to the one already mentioned, by the mouth of the operator.

Minor surgery. In a number of instances minor operations, opening of abscesses, etc., have been followed by chancre from the same cause.

Skin grafting and *tooth transplantation* have both been reported as giving rise to syphilitic infection.

Cupping, especially as practised among the peasantry of Russia, has at times given rise even to small epidemics of syphilis. The infection was mainly supposed to come from the practice of wetting the edge of the cup, which was generally of horn, with the saliva.

Eustachian catheterization. A very considerable number of cases of syphilitic infection have been traced to this cause, many of which came from the practice of one physician in Paris, and a number have been reported in this country.

Sounds, specula, laryngoscopic mirrors, and *portes caustiques* have all been charged with conveying syphilitic infection.

Dentists' instruments are an occasional means of transferring the syphilitic virus, both the sharper, cutting instruments and even such as the dental forceps; the result has happened, of course, from an ineffectual cleansing of the instrument after use on a syphilitic patient. Considering the abundance of mucous lesions often found in the mouth, and the virulence of the secretion, as shown by other instances of infection from this source, it is surprising that the accident does not more often happen that the dentist is infected, or that he conveys the disease to another.

Razor wounds are a well-recognized seat of chancres; but it is highly improbable that the razor plays any part in the event, other than causing the abrasion through which the syphilitic virus subsequently gains entrance. Nor is it very probable that many of the cases receive the virus from the brush, soap, or towels, at the time of the injury, for these are not at all likely to have come in contact with virus-yielding lesions. It is far more probable that infection takes place subsequently by means of kissing, etc., for, as some one has remarked, men will often get shaved before going to a house of prostitution or otherwise exposing themselves in the company of women. In some instances infection takes place in such a wound from court-plaster which has been furnished and applied by a friend who has used saliva to moisten it.

III. **Hereditary Transmission.**—This is the subject of a separate section, and need be but briefly touched upon here. It naturally divides itself into (1) syphilis from the father, (2) from the mother, (3) from both parents.

1. *Syphilis from the Father.*—While the syphilitic man may procre healthy children, all are now pretty much agreed that the child may herit syphilis from the father alone, without the mother acquiring the ease: in this case the syphilitic poison is conveyed through the semen the ovum at the time of conception. The fact, commonly known Colles's law, that the mother bearing a syphilitic child and yet hers showing no signs of syphilis can not be infected at the breast by her o child, while the child may infect a healthy wet nurse, has been thoug to show that the mother received the syphilis and so infected the chil but the rather numerous and credible instances of exceptions to this l reported in late years, afford additional proof that the child may recei the syphilis from the father alone. It is thought that the disease rather milder under these circumstances.

2. *Syphilis from the Mother.*—All observers agree that syphilis m be acquired from the mother alone, and that, at the time of conception, she be in the active stage of syphilis, uninfluenced by treatment, the ch will surely be infected; if, indeed, the child is not born dead or the pr uct aborted at a non-viable age. The questions relating to the influen of syphilis acquired at different periods of gestation will be discussed connection with hereditary syphilis.

3. *Syphilis from Both Parents.*—When both parents are active syphilitic, escape from hereditary influence is well-nigh impossible. T effect of the syphilitic poison may be even more far-reaching than is hibited by the production of syphilitic offspring, and not at all inf quently sterility results. The same may occur from active syphilis either parent alone, until the disease is overcome by treatment.

IV. **Maternal Infection.**—There has been no little difference opinion among able syphilographers in reference to the question as whether a woman can receive syphilis through the uterus, without acqu ing the disease in the ordinary way through the medium of a chanc Many have strongly advocated the view that she can, while others ha stoutly denied the fact. The subject may be considered under the tw heads: (1) infection by conception, and (2) infection by semen.

1. *Infection by Conception.*—It is universally granted that what h just been referred to as Colles's law holds good almost invariably: t mother of a syphilitic child does not receive a chancre of the breast fro nursing her own child, while the healthy wet nurse readily becomes i fected thereby—that is, the mother has in some manner been render incapable of receiving the syphilitic virus, and, although she may not the time exhibit any evidences of syphilis, it continually happens that the may appear later. Granting the exceeding great difficulty of determini with certainty that a woman has not had a chancre deep in the vagina on the os uteri, the innumerable instances of maternal infection on reco

by competent observers, without such having been found, would seem conclusive evidence that the mother can be infected through the medium of the uterine circulation from a syphilitic fœtus.

Further, it is a well-proved fact that a woman free from syphilis at the time of conception may transmit to her child a syphilis which she has acquired at least as late as the seventh month of gestation. Now, if the syphilitic poison can pass from the mother by means of the utero-placental circulation to the child, it can also pass, as do the results of the fœtal nutritive changes, from the child to the mother, so that she can be infected by the poison which the ovum has received in fecundation, and which has multiplied with its growth so as to infect the whole child; in other words, the mother can be infected by the conception of a child inheriting syphilis from its father, without acquiring a chancre herself.

2. *Infection by Semen.*—Although many have strongly opposed the view that syphilis could be communicated by the semen without conception, and although the experiments of Mireur with inoculation of this fluid upon four healthy subjects were negative, there are reasons for believing in the possibility of infection by the semen. Moreover, there have been a number of cases, reported by good observers, where, after a very careful investigation, this seemed to be the case.

We have already seen that both the ovum and the spermatozoön are capable of giving the disease to the resulting fœtus; the spermatozoa which hold the syphilitic virus are known to travel up the uterus and through the tubes, so as even to produce fecundation in the abdominal cavity. It does seem more than probable that during their course, perhaps as they become ordinarily disintegrated, the syphilitic element may find a proper lodgment within the uterine cavity, and so infect the woman, even without the formation of any initial lesion.

An explanation of supposed direct infection by semen may, however, perhaps be found in infection by conception—that is, although the woman may not have borne children, still she may have had transient impregnations which were cast off after a few weeks, but which sufficed to develop the syphilitic poison in the fœtus enough to infect the mother.

SYPHILIS INSONTIUM.

The subject of the innocent acquiring of syphilis, or *syphilis insontium*, is a large one, and its full consideration would be out of place here. Those interested in the subject are referred to the Alvarenga prize essay, of the College of Physicians of Philadelphia, by the present writer,* where will also be found full references to the matter already given. A careful study of the literature of the subject shows that the disease has been acquired innocently in vast numbers of instances, and in ways and means which would never have been previously suspected. New methods of infection have been from time to time reported, while of course thousands of cases occur where no accurate knowledge is obtained of the manner in which the disease is acquired.

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* Syphilis Insontium: A Clinical and Historical Study of Syphilis innocently acquired. By L. Duncan Bulkley, M. D. New York, 1893.

It has certainly come to pass that syphilis is no more to be looked upon as invariably a venereal disease, nor the person afflicted with it to have been necessarily guilty of improper sexual relations. In a recent article, Fournier showed that in at least twenty-five per cent of the females with syphilis whom he had seen in private practice the disease was acquired in a perfectly innocent manner; and after a careful study of the data of those coming under my own care in private practice I am confident that even a very much larger proportion of the females with syphilis were innocently infected.

The following table, compiled from the statistics of a number of venereal clinics abroad, shows the relative frequency of extra-genital infection occurring among them. Here it will be seen that in 353 instances, or nearly five per cent, the primary lesions were found elsewhere than in the genital and peri-genital region.

TABLE I.

Genital and peri-genital chancres	6,770
Chancre of the lip	184
" " breast	41
" " fingers and hand	33
" " tongue	17
" " throat	16
" " nose	8
" " chin	7
" " eyelids	7
" " cheek	6
" " buccal cavity	6
" " neck	4
" " forehead	3
Unclassed	21
Total genital and extra-genital	7,123

But the proportion of extra-genital chancres is yet larger than is here indicated, for these statistics relate to venereal clinics, whereas large numbers of cases present themselves in skin clinics, as also in those of the eye, throat, etc., and numbers are seen in surgical and obstetrical practice. These chancres affect all parts of the body, and it is safe to say that there is hardly any locality which has not been the seat of the initial lesion of syphilis. In the next table are given the location of a large number of extra-genital chancres, most of them innocently acquired, collected from reports of individual cases reported here and abroad.

TABLE II.

Chancre	of the	lip	1,810
"	"	breast and nipple	1,148
"	"	buccal cavity	734
"	"	fingers and hand	462
"	"	eyelids and conjunctivæ	372
"	"	tonsils	307
"	"	throat (deep oral and nasal)	264
"	"	tongue	157
"	"	chin	146
"	"	cheek	145
"	"	trunk	100
"	"	nose	95
"	"	anus	87
"	"	peri-genital region	77
"	"	legs and thigh	73
"	"	forearm	59
"	"	neck	47
"	"	gums	42
"	"	forehead and temple	37
"	"	ears	27
"	by	vaccination	1,863
"	"	cupping and phlebotomy	745
"	"	circumcision	179
"	"	tattooing	82
Total			9,058

In this table chancre of the lip is seen to lead all the rest, and the principal cause for the sore in this location is undoubtedly kissing. On analyzing the data from which these come, it is seen that an exceedingly small number of the cases come from venereal relations.

Chancres of the breast and nipple which come next in frequency are becoming relatively rare, as the danger from syphilitic nurslings is better known and appreciated.

It is unnecessary to comment on each of the other locations here presented, but it is interesting to note that there are no less than 571 cases of chancre of the tonsils, or of the deep cavity of the throat, in addition to the 734 cases as reported "in the buccal cavity"; these, with those of the tongue and gum, make a total of 1,504 cases where the initial lesio syphilis occurred within the cavity of the mouth. In doubtful case syphilis, therefore, it is always wise to consider if the infection may have occurred in this hidden region, for experience has shown that sore in this locality often escapes detection for long periods. From experience of many who have studied the subject, it is highly prob that chancre within the cavity of the mouth is much more frequent even these statistics would seem to indicate.

PRIMARY SYPHILIS.

By EDWARD BENNET BRONSON, M. D.

Definition.—By primary syphilis is generally understood that phase or condition of the disease which precedes any visible signs of general infection, and is attended only by certain local changes in the vicinity of the site of inoculation. These local changes consist of a more or less characteristic lesion situated at the precise site of inoculation, and known as the *initial lesion*, or syphilitic chancre, and an enlargement of certain neighboring lymphatic glands called the *primary adenopathy*. Like each of the three stages into which, for the sake of convenience, the clinical course of syphilis has been divided, the primary stage has received somewhat vaguely defined limits. For many authorities syphilis becomes a constitutional disease very shortly after its specific virus has been inoculated. The first local sign of infection is regarded as actually a symptom of systemic disease. Indeed, if there be such a thing as a specific syphilitic poison, it must be admitted that, from the moment this poison has been effectively inoculated upon a susceptible subject, this subject unquestionably has syphilis, whether the infection be directly a general one or for a time remains localized, or even should it remain permanently local and never become a general disease. Primary syphilis, then, begins with inoculation. To fix the precise period at which this stage terminates is more difficult. Though the outbreak of a general exanthem, syphilitic fever, and like symptoms evidently marks some definite change in the course of the disease, these signs are not necessarily the first evidence of constitutional syphilis. Preceding these symptoms, often or usually, there are evidences of cachexia and *malaise*, prodromata that indicate clearly that a dyscrasia or some sort of systemic derangement is already in progress before the characteristic marks of secondary syphilis can be discerned. Nevertheless, for a clinical division these marks are sufficiently distinctive, and with their first appearance primary syphilis may be said to have terminated.

Duration.—The duration of primary syphilis varies within very wide limits. In thirty-one cases of artificial inoculation collected by Bäumler (Cyclopædia of the Practice of Medicine, edited by Ziemssen, New York, 1875, p. 76), in which positive results were obtained, the longest period was one hundred and fifty-nine days. The shortest in which any secc ary manifestations were observed was thirty-four days. The mean d tion in twenty-five cases in which the occurrence of secondary sympt was noted was seventy-five days. In round numbers the period ma said to vary from nine to eleven weeks. It is customary, howeve computing the time, to divide this period into two, known respectivel the first and second periods of incubation. The first of these embr the time elapsing between the inoculation and the appearance of the tial lesion, these two events being always separated by an interval of c or weeks. The second period of incubation covers the time interve between the first appearance of an initial lesion and the outbreak of symptoms of systemic infection.

First Incubation Period.—After any region or tissue of the b has been inoculated with the syphilitic poison there invariably interv a period of latency, during which the virus to all appearance is dorn and inactive. Every trace of the little abrasion or solution of contin through which the poison effects a lodgment in the tissue disappears, no sign either local or constitutional betrays the fact that an infection taken place. What processes of preparation may be taking place du this period of apparent quiescence may only be conjectured. We conceive them to be analogous to the germination of seed sown in a tile soil, though here the soil is a living tissue whose subsequent react furnish the only evidence of changes in the implanted germs of syp The period at which these reactions first become manifest doubtles pends more on the nature and constitution of the soil than upon any ation in the character of the seed or virus. It has been observed, howe in experimental inoculations that virus taken directly from the prir lesion of syphilis or from mucous patches is followed by a somev shorter period of incubation than that which follows inoculations ei from matter of secondary pustular lesions or from syphilitic blood. S variation, therefore, in the length of the incubation may be due to source from which the virus is derived.

Comparing the results of artificial inoculations of syphilitic virus tained from various sources, the mean duration of the period of first i bation has been found to be about twenty-six days. The result thus tained corresponds pretty nearly to what is observed in ordinary clin practice. Julien collates the observations of different authorities n this point with the following results: Diday found the mean duratio be fourteen days; Clerc, fourteen to sixteen; Chabalier, fifteen to ei een; Le Fort, nineteen; Rollet, twenty-five; Fournier, twenty- Sigmund, twenty-eight to thirty-five; Du Mauriac, forty. Taking t nine series of observations together the mean is twenty-three days. there are wide variations from this. For example, Fournier repor case in which the first incubation was seventy days; Simonet and Le Fort, three cases with a duration of ninety days. On the other hand, Diday once saw it last but twenty-four hours, and Le Fort mentions three cases in which it did not exceed seventy-two hours. Cases of such brief incubations as these must, however, be extremely rare. Bearing in mind the possibility of exceptionally long or short periods of incubation, we may pretty confidently look for the appearance of the initial lesion *between a fortnight and a month* from the date of exposure.

Second Incubation Period.—The local sign of infection having made its appearance, another prolonged interval of time elapses before evidences of constitutional infection appear. This is the second incubation. Like the first, it is of uncertain duration, and just what influences determine it are not definitely known. Generally speaking, the more depraved the patient's condition, the more it is subjected to bad hygienic influences, such as deprivations, alcoholic or other excesses, emotional disturbances, and the like, the shorter this period of incubation; while, on the other hand, the fact is pretty generally recognized that by early constitutional treatment, more particularly mercurial treatment, its duration is lengthened. Furthermore, its duration is said to be greater in cold than in hot weather. The shortest period that has been recorded was noted in an experimental inoculation of syphilitic blood by Lindwurm. In this case it was stated to be from eight to fourteen days. In another experimental inoculation by Lindmann, where matter from a secondary ulcer was used, the second incubation was said to be one hundred and fifty-nine days.

In the series of inoculations above referred to the mean duration of the period was between six and twelve weeks. We do not look, therefore, for secondary manifestations under forty days from the appearance of the initial lesion.

THE INITIAL LESION.

This lesion (which is also known as the primary affection, the initial or primary sclerosis, the chancre, the hard, infecting, or syphilitic chancre) is the chief symptom of the second incubation. It invariably begins at the precise point at which the virus has been inoculated, whether one or more. Usually the first thing observed is a *papule*—a slightly elevated or perfectly flat red spot that imparts to the touch a slight sense of resistance, implying the presence of an infiltration. If carefully watched, simply a spot of redness may be perceived before any sign of infiltration can be detected. Again, when attention is first called to it, the surface may appear slightly abraded and moistened with a scanty, clear, sticky secretion. Such are the appearances, at its inception, of the syphilitic chancre when uncomplicated by the presence of any other poison than that of syphilis. Thus far they seem trivial and inoffensive, and not infrequently are entirely overlooked. Even to the practiced eye they are insuffici to make the diagnosis until further development of the process rev more positive signs. The first and most characteristic of these is a cumscribed hardening of the lesion. Gradually the infiltration increa and what was merely a reddened spot, with possibly a trace of thicken in the tissue, becomes a distinctly indurated papule or patch.

Induration.—The induration of the base is rarely absent from an the forms of the syphilitic chancre. According to Fournier, in not m than one per cent of the cases does it fail to be perceptible. It va greatly, however, in degree; sometimes so slight as to be barely ap ciable to the touch, and sometimes appearing in the form of a hard tu in the skin, which when held between the fingers feels like a lum cartilage or wood. It varies also in form. It may be superficial, pl like, lamellar, feeling as though a piece of parchment or thin leather been mortised into the skin, or it may occur as a firm, rounded nod often with prominent borders and a more or less sunken center, especi in ulcerating forms. When the induration is slight, considerable skill experience may be required to detect it. If grasped and rolled betw the thumb and finger with gentle pressure, the resistance and sharp de tion of its margin will usually distinguish it sufficiently from the dou ill-defined hardness of an ordinary inflammatory thickening, or from infiltration of the simple or "soft" chancre. In many cases it i obvious to the eye as to the touch. The circumscribed, rounded, indo tumor, extending beyond the seat of ulceration or erosion, is often in i characteristic. If subjected to pressure by the fingers or in any o way, as, for example, when situated upon the prepuce by slowly ret ing the foreskin, the resistance offered by the hard tumor produces a t porary ischæmia of the intervening blood-vessels and the surfac blanched. When the prepuce is retracted with an induration on its in surface, the resistance to its eversion is similar to that of the tarsal c lage when the upper eyelid is everted.

To best appreciate the induration by touch, the tissues must be and lax as well as easily accessible. It can usually be more easily upon mucous membranes than upon the skin. It is hard to make it when the tissues are firm and resistant, as, for example, upon the fing For the same reason it is not always distinct upon the glans penis no the cervix uteri. In the latter situation it might be mistaken for a tricial thickening, such as often follows injuries to the os in parturit An induration of the female genitals is more often overlooked than when affecting the male genitals, and partly for the reason that in former case it is not apt to be so conveniently situated for palpation.

The *involution* of the syphilitic induration is accomplished slo and is often not complete till some weeks after the occurrence of sec ary manifestations. Under local and especially under mercurial constitutional treatment it disappears more rapidly than when left to its natural course. As with other granulomata, involution begins at the central or oldest portion of the little tumor, which accounts for the slight depression that usually appears sooner or later, and is the point where ulceration or erosion is most apt to occur, though these latter are by no means necessary concomitants.

Occasionally certain vestiges of the initial lesion persist for long periods. Usually a slight pigment spot only is left, which disappears in a short time, the pigmentation first disappearing from the center and gradually receding toward the periphery, resembling a spot of vitiligo. Sometimes the loss of pigment over the site of the induration is such as to leave a minute patch, whiter than the surrounding skin, and this may persist for years. In other cases the induration, instead of undergoing complete involution, becomes to a certain extent organized, leaving a little knot of cicatricial tissue which never disappears. In some rare instances, when the primary induration has lasted long beyond its usual duration, there may be a transformation of the lesion into a gummy tumor. Unna (Vierteljahressch f. Derm. u. Syph., 1878, p. 567) excised an induration of the prepuce, of eight years' standing, which was the remains of an initial lesion, and found the characteristic structure of a gumma. In a large proportion of cases, within a month or two after the advent of the secondary period every trace of the primary lesion has disappeared.

Number of the Lesions.—In simple noninfecting chancre the lesions are, as a rule, multiple; at least they tend to become multiple sooner or later, owing to the virulence of their copious secretion and the liability to auto-inoculation. The syphilitic chancre after it has fully developed is practically non-auto-inoculable. At the start there is perhaps as much likelihood that the simple chancre will be single, as the syphilitic, but subsequently multiplicity becomes in the former one of its diagnostic marks. When the syphilitic virus is brought in contact with two or more abraded spots at the first exposure each of these becomes an independent port of entry, and at each one an independent initial lesion develops. Under these circumstances the multiple lesions usually develop simultaneously. It sometimes happens, however, that during the period of incubation the patient exposes himself to a fresh inoculation with syphilitic virus. In that case the inoculation is usually ineffective, unless it occur within a short time after the first inoculation. Though the time at which immunity from a second infection is acquired is not absolutely determined, it is certain that unless the second inoculation be sufficiently far in advance of the period of constitutional infection, the incubation will be interrupted and the development of a second chancre will be forestalled. There is reason to believe, however, that in some cases suc-

cessive chancres are the product of successive inoculations. Du Ca
(Ann. de Derm. et de Syph., 1890, page 423) has reported two case
primary syphilis, in one of which there were thirteen separate lesi
and in the other seven, all apparently syphilitic in character. Tho
tending to deep ulceration, none of them were auto-inoculable, and
glands were but slightly affected. In both cases constitutional syp
followed.

Multiplicity in the initial lesion of syphilis is doubtless often du
pre-existing lesions of the part affected that destroy the integrity of
epidermis or epithelium at several points, and thus afford as many po
of entry for the syphilitic virus. The so-called herpetiform chancre
Debuc may be produced in this way, the original inoculation having
effected through the ruptured vesicles of a herpes progenitalis.
multiple erosions of a balano-posthitis may become the sites of infect
in which case there is usually, besides several distinct chancres, a mor
less diffuse thickening of the prepuce and glands. Similarly the inoc
tion of "sore nipples" in a wet nurse is often followed by multiple i
rated lesions. In this case, as in the majority of instances where the in
lesion is multiple, it is usually impossible to determine whether the in
lations at all the affected points were simultaneous or not, for sev
syphilitic chancres may develop successively, notwithstanding all po
were inoculated at the same time.

Varieties of the Initial Lesion.—Variations in the form or co
of the so-called syphilitic chancre may depend either on accidents att
ing the inoculation, as in the cases of multiple lesions just mentioned
upon the susceptibility and peculiarities of the individual, or of the
ticular part or tissue affected. In its simplest form—the form in whi
most commonly presents itself after artificial inoculations—the in
lesion is merely an indurated papule. It is generally designated as

The Dry Scaling Papule.—In some cases after accidental infectio
well as after experimental inoculation it runs its entire course wit
any further solution of continuity than consists in a slight desquama
of the cuticle. The surface remains dry, and in its course and gen
appearance, except for a little more hardening of its base, the le
closely resembles a lenticular papule of the secondary stage. It is usu
met with upon a free surface, where unexposed to maceration or fric
A similar lesion may occur upon the mucous membrane, where two
faces are in apposition, but there is usually thus a tendency for the inf
tion to spread peripherally, so as to form a platelike induration, the
thelium remaining intact. The following curious case was of this c
acter: "The patient had an unusually long and relaxed prepuce.
glans had an appearance as if some whitish substance like wax had
introduced just beneath the epithelium, so as to form a flat, unif

coating, slightly elevated above the *niveau*, and terminating near the corona by an abrupt rounded edge, without any encircling areola or swelling. Above this the epithelium seemed to be perfectly intact, and was firm and smooth, with a bright, glistening aspect entirely unlike the dull, moist, sodden appearance of a mucous patch or an erosion covered by a membranous exudation. To the touch there was a slight degree of resistance, but no marked induration. . . . Its peculiar course was doubtless influenced by the presence of the elongated prepuce, which by its pressure may have tended to cause the infiltration to spread out in area, while at the same time it protected the epithelium from injury or abrasion. The lesion was accompanied by indurated inguinal glands and was followed by syphilis." (Wood's Reference Handbook of the Medical Sciences, vol. ii, p. 67, New York, 1886. The same case was reported also by Morrow, in Arch. f. Derm., 1876, p. 383.) Taylor states that sometimes similar lesions form about a central nodule of induration.

The Superficial Erosion.—This probably represents the most common form of the initial lesion when uncomplicated with simple chancre. It appears as a little round or oval spot, from which the superficial layers of the epithelium have been removed, and which presents a slightly moist, smooth, raw surface. It may be covered with a gray film, which frequently, however, occupies only the central portion. The edges are level with the surrounding skin, while toward the center there is often a slight depression. Occasionally the surface is raised like a little dome above the *niveau* (*ulcus elevatum*). This elevated form is most frequently observed at the borders of the prepuce, upon the frenum, the lips, the tongue, or upon the vaginal portion of the womb. The center of the little elevation may be slightly indented. Occasionally the superficial erosion is transformed into a mucous patch, or condyloma, especially in situations habitually moist, and hence tending to produce maceration.

The Ulcerating Initial Lesion (*Ulcus durum*, Hunterian chancre).—As already intimated, among the processes that take place during the stage of primary syphilis, ulceration constitutes no essential part. The initial lesion may pursue its entire course and disappear without a trace of ulceration, and even without the surface being eroded. It would be well, indeed, if the term chancre, which properly denotes a corroding sore, were restricted to that form of septic and destructive inflammation which is almost constantly venereal in its origin, and which in this country has come to be known almost universally by that superfluous and irrational designation *chancroid*. If any disease should be called chancre, it is the one whose constant and essential feature is destructive ulceration; while, if the term chancroid is applicable to any disease, it is most so to the one which only accidentally ulcerates or becomes chancrous. The use of the term chancroid for the soft venereal sore is inferentially an indorsement of the doctrine of Clerc, who first adopted it, in the belief that there was no tagious venereal sore not of syphilitic origin. The soft sore origin from the inoculation of syphilitic virus upon a syphilitic individual. was merely a modified syphilitic sore. It was the derivative of the sy litic chancre, and in that sense might properly be called chancroid. Clerc's doctrine being now discarded, this justification of the tern longer exists.

Ulceration is, however, a very frequent complication of the in lesion of syphilis, and may even be of a corroding character—that may be attended with pretty extensive destruction of tissue, and ma closely resemble in its salient features the soft venereal sore, that u these circumstances it is convenient to speak of the *syphilitic chanc* contradistinction to the "*simple*" or *nonsyphilitic chancre.* It no frequently happens that both diseases are inoculated at the same p whether simultaneously or at consecutive periods, and each produce own peculiar effects in the so-called "mixed chancre," which will be sidered later on.

Moreover, the syphiloma is a growth of very low vitality, and u irritative influences of various sorts is exceedingly prone to rapid dis gration. Its presence so affects the growth and nutrition of the ov ing epithelial or epidermic structures that under the action simpl heat and moisture these structures become macerated and easily ero In this way ulceration may occur simply as the result of spontaneou integration, though most frequently aided by extraneous influences an the presence of septic agencies not necessarily chancrous. But usual syphilitic chancres the loss of substance from ulceration is more app than real, owing to the central depression and salient borders of th duration. The resulting cicatrix is often insignificant, when the ap ance of the ulcer seemed to denote an extensive destruction of tissue. all events, the ulcer of the syphilitic chancre is very different in ap ance from that of the simple chancre. Its edges are not undermine jagged, and are sloping instead of perpendicular. Even in the de ulcerated or infundibuliform ulcers the edges do not rise abruptly t surrounding skin, but approach it gradually by a smooth incline. altogether a less virulent disease, so far as the local effects are conce is less inflammatory, less sensitive, has a less abundant secretion. Bu chief evidence that it is less virulent is shown by the absence of that acteristic property of the soft sore—to wit, auto-inoculability. The s litic chancre is not auto-inoculable unless it contain some virus other that of syphilis. It is a well-known fact that any syphilitic ulcer through simple inflammatory irritation, acquire a virulence sufficie render it auto-inoculable. Practically the only virus that is known to duce this effect in the syphilitic initial lesion is the virus of the "sim chancre. As intimated above, both these affections may exist at the same time and within the same area. The product is known as

The "Mixed Chancre."—Those effects which this term is designed to express have been observed almost exclusively in connection with accidental infection and usually of venereal origin. Never have they been known to occur when syphilis has been inoculated from pure syphilitic lesions experimentally. Yet it is these very effects that have long been the subject of contention between the unicists and the dualists; between those, on the one hand, who believe that syphilis and chancre are essentially one disease, and those, on the other, who maintain that they are two separate and independent diseases. That the latter view is the one upheld by the writer is sufficiently implied in what has already been said.

Viewed from the most rational standpoint, the so-called mixed chancre is not, properly speaking, a peculiar variety of chancre, but rather represents an accidental combination of two diseases, viz., syphilis and chancre, just as in the late squamous syphiloderm of the palm we may have a combination of syphilis and eczema. As in this latter case it is often extremely difficult to tell precisely what lesions or appearances are due to syphilis and what to eczema, so, in the mixed chancre, the two independent processes are very liable to be confounded. It is, furthermore, a sufficiently well-known fact that oftentimes a lesion, more especially venereal, whose appearance at first can not be distinguished from the soft chancre, is followed by induration of its base, and in due course of time by constitutional syphilis. Moreover, it is generally conceded that, of two individuals cohabiting with the same person and at nearly the same time, one may acquire chancre simply, the other syphilis. Doubtless facts of quite similar purport might be cited with regard to the inoculation of vaccinia and syphilis. Considering the multiplicity of accidents that may occur, and the various modes of contagion possible in promiscuous intercourse, any conclusions derived from their consequences must necessarily be very inexact. Any inferences drawn from such sources that are adverse to the doctrine of duality are more than offset by the one indubitable fact that, whenever in experimental inoculations the virus has been taken from uncontaminated syphilitic lesions, no such effect has ever been produced as could for a moment be mistaken for the simple chancre. Simple chancre is produced only by simple chancre, and if syphilis follows there is always reasonable ground for the inference that with the chancrous virus there was commingled syphilitic virus. The result of this combination is a lesion which at first, and for a considerable period, has all the characteristics of, and indeed is, a soft chancre. But in the tissue beneath, where at the same time were lodged the germs of syphilis, the primary incubation is in progress, and in process of time, as the syphilitic induration of the base reveals itself, the lesion is gradually transformed

from the virulent, inflammatory chancrous sore into the characteri
form of the exulcerated initial lesion. This change takes place usu
soon after the completion of the first incubation period, and by the ti
the induration has fully developed all the characteristics of the sim
chancre may have completely disappeared.

When the ulceration in the initial lesion is extensive, the inductio
the base and borders is usually in proportion, though in some cases, w
it spreads rapidly or is phagedenic, the induration melts away befor
and may be scarcely perceptible. Sometimes it happens, after the ul
has cicatrized but the induration still remains, that the cicatrix reop
and ulceration begins afresh. It is the so-called relapsing chancre (*chan*
redux). Under these circumstances the sore is liable to become gang
nous. A moist, gray, pultaceous slough forms, which after separat
may be succeeded by another and thus lead to a spreading phagede
The induration may break down interiorly and open upon the surface
a number of apertures. Such events are more liable to occur when
sclerosis is extensive.

THE PRIMARY ADENOPATHY.

An invariable accompaniment of the initial lesion is an enlargem
and induration of the nearest lymphatic glands, or those with which
lesion is in most direct anatomical communication. It usually appears
the end of the first week after the appearance of the initial lesion, thou
occasionally later. In some rare cases, more especially in very fat s
jects, it may be impossible to feel it at all, but there is every reason
suppose that it is present nevertheless. In its nature this glandular
largement corresponds very closely to the induration at the point of in
ulation. Though the hyperplasia is inflammatory, the inflammation
of a sluggish, indolent character, unaccompanied by heat, redness, pa
sensitiveness, or œdema. Usually several glands are involved, produci
a polyadenitis which markedly distinguishes it from the monadenitis
the simple chancre. Each gland can be separately felt as a hard, rou
sharply defined nodule, freely movable under the skin. In some sit
tions but a single gland may be accessible to the touch, as in the case
some extra-genital lesions.

The most characteristic adenopathy, and the one most frequently
served in primary syphilis, is that following inoculation of the genitals
the so-called syphilitic bubo. In this case the cluster of enlarged gla
in the groin is in marked contrast to the single, inflamed, baggy, or fl
tuating tumor of the bubo of chancre. Usually three or four glands
distinct, though at the commencement but one may be felt on the si
corresponding with the initial lesion. The adenopathy may remain co
fined to one side, though rarely, and is usually most pronounced upon t

side first affected throughout its course. The glands most readily felt are the superficial ones that lie just along the line of Poupart's ligament, though it is certain enough that the affection is not confined to these. The crural glands are doubtless more or less involved, as well as the iliac. Three specimens preserved in the *Musée de Lourcine*, and described by Fournier, will show the extent to which they may be implicated. These specimens were taken from women who died in the primary stage of syphilis with genital chancres. Besides the enlarged glands in Scarpa's triangle, others occurred along the iliac vessels as high up as where the hypogastric is given off.

Very rarely in the primary adenopathy of syphilis is there suppuration. When it occurs it is either due to the fact that the initial lesion has been irritated and inflamed, or else because the lesion is a "mixed chancre." In the last case the secretion of the suppurating gland has the ordinary virulent properties of the chancrous bubo.

LOCATION OF THE LESIONS OF PRIMARY SYPHILIS.

We have no reason to suppose that the tissues of the body are not everywhere equally susceptible to syphilitic infection; the sole condition being that the virus be brought into sufficiently direct communication with the absorbents. Excepting the instances of infection by inheritance, or through the medium of the utero-placental circulation, the only parts ordinarily exposed to syphilitic contagion are the cutaneous surfaces or the mucous membrane near the mucous orifices, and in these situations the incipient lesions are always the same—an induration at the point of inoculation and a neighboring adenopathy. Inasmuch as in the great majority of cases the origin of syphilis is venereal, most frequently the initial lesion is upon the genitals.

Lesions upon the Genitals.—In the male, the most common situations are, first, the balano-preputial fold, or *sulcus coronæ glandis*, where rents or abrasions are most liable to occur, and following this the mucous membrane of the inner surface of the prepuce, the frenum, the preputial orifice, the outer surface of the foreskin, the glans, meatus, urethral canal, scrotum, and peno-scrotal angle.

In the *sulcus* the lesion may be either in the form of the superficial erosion or of the ulcerating variety known as "Hunterian chancre." There is a tendency for the secretions to collect in this situation, giving rise to suppuration and the production of an ulcer.

Sometimes in this region the infection apparently begins in a follicle, causing a little cylindrical induration in the mucous membrane, which may afterward ulcerate. A number of such indurated follicles may coalesce so as to form a hard, massive thickening surrounding the glans like a collar.

Upon the *mucous membrane of the prepuce* the induration is usua well marked, and when the foreskin is everted slowly the blanching of surface is especially characteristic. At the preputial orifice the les may appear in the form of the "dry, scaling papule," and in some ca especially of congenital phimosis, as a massive, cartilagelike indurati Occasionally in this situation it may take the form of an indura fissure.

Upon the *glans* the appearances of the initial lesion vary according the part is habitually covered or not by the foreskin. In the former c it usually occurs as a "superficial erosion"; in the latter it may be "dry papule."

When the *meatus* is the seat of the primary lesion the inductio apt to encroach upon the passage so as to cause more or less impedim to the flow of urine; but the constriction is only temporary, and usu entirely disappears when the period of primary lesion has elapsed. cording to Bassereau, of 361 syphilitic chancres, 14 were in the uret but all near the meatus. Clerc found 33 in 404 cases, all at the mea Fournier found, out of 474 initial lesions, 32 at the meatus, and 17 deeply situated in the canal that they could not be seen by stretch open the lips. Among 1,773 cases of Bassereau, Fournier, Clerc, Léon le Fort, tabulated by Julien, there were 89 at the meatus, while o 17 occurred more deeply in the urethra. Syphilitic initial lesions c cealed in the urethra (*chancres larvés*) may, as taught by Ricord, acco for a certain number of cases of syphilis in which the ports of entry main undiscovered; but nevertheless such lesions must be extremely r

The female genitals, according to Fournier, are liable to syphil infection in the following order: The labia majora, the labia minora, fourchette, uterine neck, region of the clitoris, vestibule of the vagi meatus urinarius, upper commissure of the vulva, and vagina.

The effect of the moisture to which it is exposed upon the fem genitals is apt to produce certain modifications of the initial lesion, of converting it into the form of the mucous patch. Condylomata are much more frequently associated with the primary sore of the geni in the female than in the male.

When the lesion occurs upon a *labium majus* it is often of an thymatous character. In this situation also it may be associated wit superficial lymphangitis, giving rise to an indurated œdema, and in so cases results in a hyperplasia or elephantiasis that may persist for year

The *fourchette* is less liable to be the site of the syphilitic initial les than of the simple chancre, the relative frequency of the latter in situation being due to its exposure to auto-inoculation.

Syphilitic chancre of the uterus occurs more commonly upon the terior than the posterior lip. It usually appears as a smooth, flat, or so times elevated lesion, of a grayish color, as though covered by a false membrane and encircled by a red border. Unless the induration is massive it is not easy to make it out by the touch. The adenopathies attending the lesion in this situation may be confined to the pelvic glands. The glands in the groin are not often affected.

Primary syphilis of the vagina is extremely rare. The toughness of the mucous membrane lining this cavity, as well as its distensibility, render it but little liable to a rent or other injury which could serve as *foramen contagiosum;* and furthermore, the abundant secretions that flow over it would tend to prevent the lodgment of the poison. Should the lesions occur in the vagina, the inguinal glands would be enlarged.

Extra-genital Lesions.—The syphilitic primary sore is relatively much oftener extra-genital than the simple chancre. According to statistics collated from different authors by Julien, out of 3,956 simple chancres, 66 were extra-genital (not including the chancres of the anus), or about two per cent; while out of 1,977 syphilitic chancres, 126 were extra-genital, or over six per cent.

Again, extra-genital chancres are much commoner in women than in men. According to the authority just referred to, they amount to about twenty-two per cent of all syphilitic chancres in women, and less than four per cent of all those in men. This disparity in the two sexes mainly concerns the chancres of the breast, which occur almost exclusively in women. Moreover, in them the initial lesion occurs more frequently in the mouth and also at the anus than it does in men.

Of the anus. Julien states that its relative frequency in men is 1 : 119, while in women it is 1 : 12. In the former it almost always implies sodomy; but in women, while it may be the result of unnatural practices, it is possible for it to occur by mediate contagion from secretions impregnated with syphilitic virus flowing over the anus during coitus with a syphilitic man.

The lesion may occur at the sphincter in the form of an indurated fissure, though usually it appears below it. In the latter cases it is generally found in one of the radiating folds as an elongated erosion. The induration is difficult to appreciate in this situation. For this reason, and because but little discomfort is occasioned by it, it is very apt to be overlooked. The adenopathy is in the inguinal glands.

The rectum has been known to be the seat of a syphilitic chancre but very rarely.

Of the breast. As already intimated, when the breast is the seat of the primary trouble, multiple lesions are not uncommon. The most common site is just at the base of the nipple, in the furrow separating it from the areola; next in frequency upon the nipple, then the areola; and, finally, upon the surface of the breast, outside the areola (Fournier).

In its form the lesion may be a superficial erosion, an indurated fissı an ulcerating sore with depressed center, or an *ulcus elevatum.* Wl the woman is not nursing a child the lesion is often ecthymatous.] induration is usually sufficiently well marked, and remaining, as it g erally does, for a considerable time after the appearance of second manifestations, it becomes of great value in determining the original of infection. In this the enlargement of the axillary glands, toget sometimes with a chain of swollen glands just below the border of pectoral muscle, will be of material assistance.

Of the head—cephalic chancre. About four per cent of all cases acquired syphilis are said to originate in inoculation of some part of head, and more especially of the mouth. Of 852 extra-genital chanc (syphilitic) in statistics collated by Poray-Koschitz (Arch. f. Derm. Syph., 1890, Heft 6, p. 928), 632 occurred on the head, 141 on the tru 68 on the extremities, and 11 on the neck. Of 29 cases of his owı were on the lips, 7 on the breast, 4 in the throat, 3 upon the tongu on the fingers, and 1 each on the body, forearm, and hard palate. these 29 cases, the 17 cephalic chancres were all of the mouth. Acco ing to statistics given by Jullien, of 126 "extra-genital chancres" (ini lesions), 87 were cephalic, and of these, 73 were of the mouth.

Why *syphilitic infection of the mouth* should be of such frequ occurrence is not hard to understand. In most cases, probably, the co munication is from mouth to mouth. This region in syphilitics is es cially liable to moist lesions, more particularly mucous patches, the sec tions from which, always extremely contagious, may in numberless w be communicated to other individuals. It is not only by immediate c tact, as in the act of kissing, that the contagion may occur, but mediat in the most varied ways. Indeed, the possibilities in the way of medi infection are well-nigh infinite. New modes of contagion are continua being suggested, and to enumerate them all is needless, were it even p sible. Any article whatsoever that has been contaminated with the syp litic virus may become the vehicle of the disease, and however broug in contact with the mouth or its cavity, provided it finds an abrasion other aperture in the epithelial surface, may become the means of inf tion. When a nursing infant is infected from a syphilitic wet nuı it is usually in the mouth, from some specific lesion of the nipple. F thermore, it should not be forgotten that the vile practices of sodor and the species variously known to the ancient Romans as *fellat cunnilingus*, and *irrumator*, are by no means extinct, and must be h accountable for a certain proportion of cases of primary syphilis of mouth.

By far the most common situation of the initial lesion of the moı is the lips, the next is the tongue, and following these the gums and tonsils. *Upon the lips* the inoculation is most apt to occur at the site of a fissure, such as is often found either at the center of the lower lip, or on the upper a little to one side of the median line, and also at the commissures. Any other point where an abrasion happens to be may afford entrance to the poison. When the initial lesion originates in a fissure, the first appearance it generally assumes is that of an indurated cleft in the vermilion border, with red or grayish base. The induration of the lesion in this situation usually grows to a considerable size, causing protrusion of the lip, and is frequently attended with ulceration. When the sore occurs just within the lips there is generally less induration. The submaxillary glands are always enlarged.

Syphilitic chancre of the tongue is usually flat or slightly elevated, smooth, and red. When just at the tip, the appearance is often as though a piece had been sliced off. The induration is sharply defined, and the adenopathy is to be sought in the suprahyoid glands.

Initial lesion upon the tonsil is marked by considerable induration, with enlargement of the cervical glands (particularly the deep sternomastoid) and the submaxillary. Usually there is ulceration, which may be either slight or extensive. In one case, in which the patient confessed to the *rôle* of *fellatrix*, the appearance of the throat suggested a malignant diphtheria, though lacking the adherent membrane. In another, affecting a child, no ulceration at all could be discovered, and the inflammation was but slight, though the tonsil, together with the glands under the jaw, were much indurated.

Upon other portions of the head syphilitic infection is usually the result of mediate contagion, sometimes from soiled fingers (as presumably in most of the chancres of the eyelid), possibly from an unclean razor, as when the lesion appears on the chin. Infection of the Eustachian tube through catheterization with an unclean instrument has been reported.

Syphilitic infection of the fingers is an accident to which physicians and nurses are especially exposed, more particularly in the practice of midwifery, but also in various digital examinations of parts affected with syphilitic lesions or in operations upon syphilitic subjects. Sometimes a dentist is the victim. Taylor (Journal of Cutaneous and Venereal Diseases, June, 1890, p. 206) has reported two cases in which the evidence seemed to point to infection from cadavers, acquired while making post-mortem examination. He calls "attention to the fact that in both cases the autopsy was made in a comparatively short period after death. In the first, eight hours had elapsed, and in the second case nine hours after death, before the post-mortem examination was made." Such an accident must be extremely rare, and doubtless could not happen unless the examination were made shortly after death and before cadaveric

changes have taken place. But infection of the finger is not alway
syphilis insontium. What may be termed digital dalliance invol
quite as much danger as the *tactus eruditus*. Even should the c
taminated fingers escape inoculation, they may convey the infection
any other part of the body, and thus so-called "erratic chancres" n
often be explained.

The site of the initial lesion of the finger may be that of any accide
abrasion that happens to be present, and thus is brought in contact v
the syphilitic virus. Most usually it is a hang-nail that serves as the
of entry, or it may be just at the fold of the nail. The lesion is usu
attended with a great amount of thickening, and often the inductio
well marked, though it may be less sharply defined than when affec
tissues more lax. There is ordinarily but little ulceration, though
surface may look raw and red. It is often markedly elevated. I
always accompanied with an enlarged and indurated epitrochlear gl
and usually with a chain of enlarged glands in the axilla.

Diagnosis.—*Confrontation.*—Inasmuch as the initial lesion of sy
ilis is invariably the result of an inoculation of virus derived mediatel
immediately from some syphilitic individual, the diagnosis of a suspe
lesion may sometimes be corroborated or confirmed by an examinatio
the person from whom the infection has probably been derived.
method of diagnosis is, however, very unreliable, and in most cases
tremely unsatisfactory. Not always does the patient know whom to
pect, or the person suspected may be inaccessible or not amenable t
examination. The possibilities of mediate contagion greatly compli
the difficulties of the investigation. It is possible that the person gi
the disease may act simply as the bearer of syphilitic poison derived f
some prior contact with a diseased person, without being *in propria*
sona syphilitic. In such a case naturally no lesions would be found,
the confrontation would explain nothing. But, on the other hand
lesions may be found and yet the person may be syphilitic and
communicated syphilis to our patient. Though doubtless rare,
of this sort are vouched for on good authority. How are they t
explained ?

Sometimes, perhaps, by assuming that a primary or secondary le
of syphilis secreting the virus has been overlooked or concealed—pos
a *chancre larvé*. It is possible that through some tranumatism esca
blood may be the vehicle of syphilitic virus. In early syphilis the b
undoubtedly contains the virus, though in experimental inoculatio
has been found less infectious than the secretions of moist mucous
cutaneous lesions of the disease. When inoculated successfully, it
generally been during periods of activity or recrudescence of the dis
and when used copiously over rather extensive surfaces, as, for exa

in the cases of the anonymous physician of the Palatinate who inoculated leg ulcers with syphilitic blood. It is somewhat difficult to suppose that the blood of an infected person who is entirely devoid of syphilitic manifestations, and whose syphilis is presumably, therefore, in a certain degree dormant, would possess sufficient virulence to infect another person, especially when we consider the meager amount that would be likely to come in contact with so trifling an abrasion as is usually the point of infection. It can not be denied, however, that this may take place.

What secretions in the body of a syphilitic other than those coming from specific lesions may contain the syphilitic virus in sufficient amount to be infectious is not certainly known. That through the physiological secretions syphilis is not inoculable, has been pretty certainly demonstrated, except with regard to the semen; and its virulence, so far as is known, is never exhibited except in infection of the ovum it impregnates. As to pathological secretions we are not so sure. Ordinarily they are probably not syphilitically infectious unless the product of syphilitic lesions or of other lesions complicated by a syphilitic infiltration. The "mixed chancre" may communicate syphilis, because the simple chancre in this instance has, without much doubt, a syphilitic infiltration at its base. The same explanation may partly apply to the vaccine syphilis, though this mode of infection is usually explained as due to accidental admixture of the vaccine virus with formative elements of syphilitic blood.

There is a suspicion, based on respectable testimony, that certain pathological discharges from the genitals of syphilitic persons, without solution of continuity or any definite lesions of a syphilitic character in the parts affected, may communicate syphilis. Assuming this to be true, a ready explanation is afforded for the unfortunate experience of John Hunter, who acquired syphilis by inoculation of the urethra with what he supposed to be simply gonorrhœal pus. A syphilitic urethritis is admitted and described by Henry Lee, Berkeley Hill, Vidal, and others, and its discharge is believed to be capable of producing syphilis when inoculated upon a nonsyphilitic subject. Lee believes that such a urethritis or vaginal discharge may occur not only as a secondary manifestation but also as a symptom of the primary stage. In the latter case it usually occurs as a prodroma of primary syphilis, the initial lesion appearing later as a localized induration somewhere upon the genitals. But in both cases the discharge is believed to be capable of imparting syphilis (Lectures on Syphilis and on some Forms of Local Disease affecting principally the Organs of Generation, Philadelphia, 1875, pp. 62–77). Tarnowsky, of St. Petersburg, has reported experiments leading to a similar conclusion (Vorträge ueber venerische Krankheiten, Berlin, 1872). Eighteen inoculations were performed by him with blennorrhagic matter from the geni-

tals of syphilitic patients upon healthy persons, and in one insta
with a positive result. One of the persons so inoculated develope
well-marked induration, followed by general syphilis. The experim
were done under every precaution, any possible contamination f
syphilitic lesions or from admixture of blood being carefully avoi
This case would imply that not only are those urethral or vaginal
charges which are supposed to be purely syphilitic in their origin, li
to communicate syphilis, but the same effect may be produced by a go
rhœal discharge in a syphilitic subject. If the facts observed by t
authorities have been correctly interpreted, they serve to show that a d
nosis based upon the result of confrontation may be entirely fallaci
The person examined may, though syphilitic, show no obvious sign
the disease, and the presence merely of a "viscid grayish secretion, re
bling oatmeal gruel," as the syphilitic genital discharge has been descri
could scarcely be taken as sufficient ground for an accusation of spe
disease.

But this, after all, is not the most difficult case. If our patient
acquired syphilis, the effect of the inoculation will be an initial le
with features more or less clear, distinct, and easily recognized.
when the first appearance of disease has the character of a corro
ulcer that the greatest difficulty arises. Is it simple chancre, or syp
We shall now probably find, if the examination is possible, that the in
ing party has likewise a lesion or lesions with chancrous characters.
virus of chancre is there; is there also present the poison of syp
Here confrontation becomes of great value as an assistance to diag
If it be ascertained that the infecting party is syphilitic, the lesion,
ever much it may correspond in appearance to the simple venereal
has all the potentiality of the "mixed chancre" which has already
described. Syphilis may have been communicated, but whether it h
not can only be determined when the incubation period has elapsed
the transformation of the lesion from the aspect of a simple chanc
that of the syphilitic chancre described above gradually unfolds its
character.

Points of Contrast between Primary Syphilis and Simple Cha
—Unmistakable as are the features of the initial lesion of syphilis i
natural and uncomplicated form, when ulceration is associated with
in clinical practice it very often is, a differential diagnosis between s
lis and the simple venereal sore may at the start be extremely difficul
is possible only by having clearly in mind all the essential points o
tinction between the two diseases. They are exhibited in the foll
table :

PRIMARY SYPHILIS.	SIMPLE CHANCRE.
Origin.	
Often not venereal.	Almost always venereal.
Produced by either mediate or immediate contagion; by inoculation not only of secretion from the initial lesion of syphilis but from any exuding lesion of the secondary period, and possibly from certain genital discharges in syphilitic subjects not associated with syphilitic lesions.	Almost always produced by immediate contagion, and only by inoculation of secretion from a chancrous lesion—i. e., simple chancre or chancrous bubo.
Incubation.	
Usually from a fortnight to a month.	Reaction within twenty-four hours.
First Appearance.	
A papule or slightly thickened, eroded spot.	A pustule or ulcer.
Number of Lesions.	
Usually solitary; more rarely multiple, and then, as a rule, the multiple lesions appear simultaneous, seldom successively.	Rarely solitary. Multiple lesions often develop successively.
Seat.	
Not uncommonly extra-genital.	Almost exclusively on the genitals or their immediate vicinity.
Induration.	
Is almost constantly present; is firm, elastic, and sharply defined.	A rare and accidental occurrence. When present, is a simple inflammatory thickening, that to the touch is compressible, inelastic, and ill-defined.
Surface.	
Sometimes dry and scaling; more often moist, smooth, red or grayish.	Always moist or incrusted, with grayish, uneven, pultaceous surface.
Form.	
Usually round or oval, with regular outline.	At first round, later angular in outline, with irregular borders.

PRIMARY SYPHILIS.	SIMPLE CHANCRE.
Ulceration.	
Not essential; often absent. Nearly always superficial; even when excavated or funnel-shaped, edges smooth and sloping.	Essential. Deep, sinuous, with perpendi lar, undermined, or jagged edges
Secretion.	
Scanty and serous except under the influence of unusual irritation, when it may be abundant and purulent.	Copious, purulent; often sa ous.
Sensation.	
But slightly sensitive.	Sensitive.
Inoculability.	
Inoculable upon a person not syphilitic.	Always inoculable upon oth
Rarely auto-inoculable. Not inoculable upon a syphilitic person.	Auto-inoculable to an indefi extent.
Adenopathy.	
Polyadenitis; indolent; rarely suppurates.	Monadenitis; commonly ac suppurating, and virulent.

Bearing these points of distinction in mind, it should be comparativ easy to distinguish the initial lesion of syphilis from a simple chanc provided these lesions always preserved their typical character. But fortunately this is not so. In a large proportion of cases the normal f tures of the initial lesion are marked by inflammatory effects that only accidental concomitants and the product of extraneous influenc Through irritation, the syphilitic process may be diverted from its in lent course so as to closely resemble the activity of the virulent soft so A free suppuration may be excited, and a more or less deep ulcer formed, which may be associated with a baggy, œdematous infiltrati completely masking the characteristic induration, and under these circu stances might easily be mistaken for a simple chancre. Moreover, t lesion may be the "mixed chancre," when it is often impossible to c cover the presence of a syphilitic element until some time has elapsed. is not usually difficult to ascertain the presence of a chancrous vir through auto-inoculation and by confrontation, but the more serious qu tion can only be decided by the course of subsequent events.

On the other hand, a simple chancre may under certain circumstances be mistaken for an initial lesion. After cauterization of a soft sore an inflammatory hardness of the base may result that might be taken for the syphilitic induration. A similar effect may be produced when the sore is so situated as to be exposed to frequent irritation from the flow of urine. Again, the nodular thickenings in lymphangitis from inflammation of the urethra might be mistaken for syphilitic induration. According to Fournier, the lesions of scabies on the penis may sometimes resemble the initial lesion of syphilis.

Vaccination Syphilis.—Since the use of "humanized lymph" has been very generally superseded in this country by that of "bovine virus," vaccinal syphilis has fortunately become a rare occurrence. But it may still occur with "bovine virus" if the instrument used in vaccinating has been recently employed in a syphilitic case and has not been properly cleaned. It is possible that a syphilitic primary lesion, resulting either from inoculation with an unclean lancet or impure lymph, might be mistaken for an ulcerating vaccine lesion. Their distinguishing characters are as follows:

In the ulcerating vaccine lesion the ulcer develops at the site of vaccination from the twelfth tc the fifteenth day, and by the twentieth day is at its maturity. If the vaccination has been done at several points, the ulceration generally involves them all. Its appearance is that of an intensely inflamed deep ulcer, with smooth borders and copious discharge. There is usually a hard, inflammatory œdema of the base. The region about is red, sometimes erysipelatous, and the adjacent lymphatics are swollen and painful. It may be attended with considerable fever.

On the other hand, the vaccinal syphilis appears usually after the third week from vaccination, and not before the twentieth day. If there are several vaccine pustules, it rarely affects them all—frequently but one. The appearance is but slightly inflammatory. Often the lesion is covered with a crust. In case it ulcerates the ulceration is less deep than that of the simple vaccine ulcer, and there is the characteristic syphilitic induration at the base, with but little inflammation of the surrounding area. The glands in the vicinity always show the typical syphilitic adenopathy. Finally, the diagnosis is confirmed by the appearance, after the usual period of incubation, of constitutional manifestations. Sometimes a general exanthem follows vaccination, but its acute character, its early appearance (within a fortnight after vaccination), and short duration, together with the general clinical features of the cutaneous lesions, easily distinguish it from the secondary eruptions of syphilis.

Carcinoma of the genitals or mouth might possibly in some cases be mistaken for the initial lesion of syphilis. But the rapidity of evolution and shorter duration which usually characterize the latter as compared with the former, are points of distinction. Another point is the wa nodular border of cancer, in which the tissue is even denser than that the indurated syphilitic lesion. The lymphatic complication also beg earlier in syphilis; and finally the question is settled either by the occ rence of secondary syphilitic manifestations and coincident involution the initial lesion on the one hand, or on the other by a microscopic amination revealing the characteristic structure of cancer.

A tuberculous ulcer in the mouth—as, for example, upon the tip the tongue—could hardly be confounded with syphilis. Its history, frequent association with pulmonary tuberculosis, the absence of indu tion, greater irritability and more inflammatory course, should suffice distinguish it from the primary lesion of syphilis.

Sometimes an ulcerating *gummy tumor* may bear a certain rese blance to the syphilitic chancre, especially when occurring in a suspici location, as upon the genitals. But there would probably be the hist of a deep-seated nodule that had existed for some time before it fina became softened at the center, opening by a small aperture at the sum like an abscess, and gradually becoming converted into a deep, fre suppurating ulcer. The characteristic adenopathy of primary syph would be wanting; at the most, perhaps a single gland, or one on eit side, would become inflamed and swollen.

Secondary lesions are less liable to resemble the initial lesion, for reason that they are almost invariably multiple and disposed in a gr of definite form, and when attended by ulceration the ulcer is nea always serpiginous, healing at one side while it advances at anoth Furthermore, such an ulcer would lack the indurated edge and base the syphilitic chancre.

Pathological Anatomy.—The minute anatomy of the initial les does not afford a very satisfactory explanation of its peculiar clinical cl acters. The microscope plainly reveals a dense cellular infiltration, w round nucleated cells, such as are found in syphilitic lesions at all stages the disease. These cells, however, do not differ in character materi from the "granulation cells" of inflammatory growths generally. I cisely similar cells occur also in the infiltration of the simple, noninfect chancre, and have a similar distribution. In the initial lesions the c are inclosed in a reticulated fibrous structure, and are especially accu lated in the adventitia of the blood-vessels, whose lumina are thereby c tracted or entirely obliterated, differing in this respect, it is said, fr the simple chancre, in which the vessels remain patulous. At the cumference of the cellular infiltration the connective-tissue fibers fo loose œdematous meshes, as they do also in the simple chancre. At periphery of the eroded surface of the syphilitic lesion the papillæ enlarged and infiltrated, while upon the surface of the erosion vesti of the epidermis remain, with here and there traces of papillæ, together with prolongations of the rete Malpighi.

But there is nothing in these facts to account for the dense hardness of the growth. To explain this characteristic and well-nigh constant accompaniment of the syphilitic chancre various hypotheses have been proposed.

Robin and Marchal (Charité-Annalen, Bd. ix, Heft 1, 1860, p. 139), and also Von Bärensprung, regarded it as due to the presence of an amorphous connecting substance sometimes referred to as plastic lymph. Von Bärensprung believed that the chancre-induration was not to be regarded as merely an inflammatory exudation, nor, on the other hand, did it properly belong to the true neoplasms, since "it is capable of undergoing involution and resorption; it is, indeed, from beginning to end a morbid product resulting from a specific cause, of durable nature and up to a certain degree capable of organization, but afterward at the surface undergoes granular degeneration."

Michaelis (Compendium der Lehre von der Syphilis, Wien, 1859, p. 52) attributes the induration to the production of newly formed connective tissue at the periphery of the growths—a sort of fibrous callus surrounding the infiltration like the capsule of a gummy tumor. It is well known that Virchow represented the earliest manifestation of syphilitic infection—i. e., the initial lesion—as histologically the counterpart of the latest product of the disease, to wit, the gumma. But Virchow considered the morphology of the syphilitic growth as having little significance. It was "only through the mode of evolution and involution, its life-history," that it acquired its distinctive character. Kaposi also admits that from its "histological relations alone the specific character of the sclerosis" could not be inferred.

Von Biesiadecki sought to account for the induration as due partly to the fibrous growth in the œdematous tissue surrounding the lesion, but chiefly to the ischæmic and "dry" condition of the indurated tissue, and this *dryness* was attributed to narrowing of the blood-vessels through the dense cellular infiltration in the adventitia. He did not explain, however, why the same or a similar infiltration in the walls of the blood-vessels in the soft chancre caused no such ischæmia and no induration. Though Biesiadecki admitted a new formation of connective tissue about the vessels, he attached no special significance to this. He found, also, dilated lymph spaces in the sclerosis, which would seem somewhat inconsistent with his theory of "dryness." Their presence was explained as owing to the fact that there was in the case examined a coagulum in a vessel supposed to be lymphatic, the indurated cord upon the dorsum penis, and it was supposed that this coagulum had occluded the lymph channel and caused the dilated lymph spaces. Caspary (Vierteljahrsch.

f. Derm. u. Syph., 1873, p. 45), on the other hand, maintains that th spaces are due to the rigidity of the tissue surrounding them, that p vents their collapsing. Moreover, some cogent reasons are given Unna for believing that the occluded vessel in the cord of the dors was not lymphatic at all, but probably a vein.

In an important contribution to the minute anatomy of the prima lesion, Verson (Virchow's Arch., Bd. xlv, p. 117) very clearly traces t source of the induration to the new-formed connective tissue. T course of events is described as follows: "In the first stage, devel ment of exudation corpuscles, in at first normal tissue, which on acco of their location are undoubtedly derived from the interior of the blo vessels. In the second and third stages the exudation-cells throw processes that partly remain free and partly anastomose with each oth Thence there is formed a meshwork that through the continual p liferation of new cells undergoing similar changes becomes more a more dense and intricate, and finally sclerosed."

Cornil and Ranvier (Manual d'Histologie pathologique, Premi Partie, p. 186, Paris, 1869) also believed that while the cells of the ini lesion were apparently a simple inflammatory product, they were situa in an amorphous or fibrillar substance or groundwork that was the sou of the peculiar hardness of the tissue. They considered that this s stance was a mark of distinction between the syphilitic chancre and si ple inflamatory tissue. Caspary denies that the fibrillar substance wh characterizes the initial lesion occurs in the soft chancre, and for the r son that the destructive action is too rapid for it to develop. He a attributes the narrowing of the blood-vessels in the syphilitic lesion contraction of this new tissue.

The most exhaustive study that has been made of the anatomi changes in the initial lesion is that of Auspitz and Unna (Vier jahrsch. f. Derm. u. Syph., 1877, p. 161; also Ein weiterer Beitrag Anatomie der syphilitischen Initialsklerose von Dr. P. Unna, ibid., 18 p. 543). By them also the induration is attributed mainly to the conne ive-tissue growth about the blood-vessels, which is characterized as a t hypertrophy attended with sclerosis. But in addition to this they scribe certain important changes, not heretofore mentioned, pertaining the *epidermis*—changes that do not occur in the soft chancre. Both the simple chancre and in the syphilitic lesion there is moderate hyp trophy of the interpapillary portion of the epidermis at the periphery the sores, but in the initial lesion of syphilis the rete was found en mously increased, and far beyond anything that took place in the oth From the under surface of this layer prolongations descended into cell-growths and formed long processes, either joined in a reticula form or here and there completely detached from the stratum to wh they belonged, forming isolated blocks of epidermic cells, surrounded on all sides by the round cell-growth. As the latter increased it gradually invaded the epidermic layer, and, breaking through the stratum lucidum, entered the corneous layer and finally appeared upon the free surface, thus producing the eroded or ulcerated appearance of the sore. According to this, the epidermis is not destroyed, as in the simple chancre, and hence the lesion can not properly be called an ulcer.

The hypertrophy of the epidermis is considered by Auspitz and Unna as in some measure accounting for the hardness of the initial lesion. The resistance which it offers to the increasing cell-growth would tend to render the tissue denser and thus augment the induration. Unna explains the contraction of the blood-vessels as sometimes due to inflammatory proliferation of the endothelium, an "*endo-arteritis obliterans acuta*," which is believed to depend upon a previous implication of the *vasa vasorum*. But Unna thinks that it should more frequently be referred to the accumulation of cells in the adventitia and their subsequent sclerosis. The latter form, which he terms *Gefässverschluss durch Infiltration*, is said to be more likely to affect the smaller vessels, while the *endo-arteritis obliterans* is more common in the larger.

Prognosis.—As local affections merely, the lesions of primary syphilis have comparatively little importance. With few exceptions they occasion but little physical discomfort, and are rarely attended with any permanent injury to the particular parts involved. Only in exceptional instances is the ulceration of the initial lesion sufficient to cause any considerable destruction of tissue, and many times there is not even left a scar to mark its site; while suppuration, or any of the ordinary marks of an adenitis, rarely complicate the indolent adenopathy. A "cephalic chancre" may cause annoyance on account of the temporary disfigurement, and if in the throat the discomfort for the time being may be considerable. But it not infrequently happens that the local affections of this self-limited period of the disease run their course and disappear without the patient's having been aware of their existence, and in cases where they attract attention any suffering they cause is usually more mental than physical. It is for intelligent patients a period of suspense, of solicitude for the well-known dangers of which they are but the precursors. The question is naturally asked, Is it possible during this period to forecast the future of the disease?

Of one thing we can be almost absolutely certain, namely, that if the diagnosis has been correct there will be evidences sooner or later of general blood-poisoning; but whether its manifestations will be grave or light is a question that, with our present sources of information, must be answered very guardedly and very indefinitely. We say that it is *almost* certain that evidences of constitutional syphilis will follow. But cases

have been met with repeatedly in which appearances that seemed unn
takably characteristic of primary syphilis have been observed, and yet
signs of constitutional disease have been detected for long periods af
Attention is called to the numerous cases of excision of the initial les
reported by competent observers, in which apparently subsequent sy
toms were prevented. It is futile to say that in all these cases th
were mistaken diagnoses. Without here making any comment on
theory of prevention, nor on the question whether it is possible
excision of the initial lesion to prevent general infection, the fact rem
pretty clear that for one reason or another primary syphilis is not alw
or necessarily succeeded by obvious signs of constitutional syphilis. C
tainly, so far as the gravity of these signs is concerned, when they oc
at all there is between different cases the greatest disparity. So good
observer as the late Sigmund, of Vienna, used to say that forty per c
of the cases of unquestionable syphilitic infection were followed by s
slight or evanescent general symptoms, that unless carefully watched
they would escape the notice both of patient and physician, and ther
reason to suppose that sometimes they would not be discovered after
most careful watching. Again, on the other hand, some cases from
start to the finish exhibit all the features of a malignant disease. U
what does this disparity depend? Obviously enough, most of all u
the susceptibility of the individual infected, upon the vital qualities of
organism, upon the resisting power or vulnerability of his tissues.

Sometimes these qualities of the individual are evinced at the v
start. In the strumous, the weakly, the cachectic, and the aged the
mary manifestations are apt to be severe. Deep ulceration and exten
induration commonly attend the initial lesion; while the adenopath
often unusually pronounced, and may assume the form of the suppura
strumous bubo. It is admitted by most authorities that a primary le
that is attended with marked inflammatory characters, œdema, ulcerat
or gangrene, commonly betokens a severe course of the disease in
secondary period. *Per contra*, a trifling induration of the primary
without loss of tissue should indicate a comparatively benign syph
Unfortunately this does not always follow. While absence of ulcera
in the initial lesion may indicate that the syphilitic virus has compara
ly little effect upon the cutaneous structures, and that the consecu
syphilodermata may not be of a severe character, when it comes
reckoning with other divisions of the organism—the nervous system
example—the result may be very different and much more serious.

While individual susceptibility is doubtless the main factor to be
sidered in prognosis, it is not the only one. Allusion has already
made to the fact that in experimental inoculations it has been found
different degrees of inoculability pertain to the syphilitic virus depen

upon the source from which it is derived, that from such recent lesions as the syphilitic chancre or mucous patches being the most potent; that from pustules or ulcerating lesions of a later period being less so; while that from the tertiary lesions can not be inoculated at all. But when infection has actually taken place, whether the severity of the disease in its general course bears any relation to the source of the infective virus, is an interesting but undetermined question. In only one instance can we positively affirm that a special modification in the course of the disease depends upon the source from which it is derived, and that is where the mother of a child inheriting syphilis from the father acquires the disease through the utero-placental blood. It can not be positively denied that in some other instances, where syphilis has been acquired in the usual way, but by inoculation of a feeble or attenuated virus, the resulting disease may be so modified as to run a milder course. Such a supposition is in accord with what we see in epidemics of other infectious diseases. The variation in the severity of the cases occurring in different epidemics can hardly be explained in any other way than by supposing that the poison varies, and is more active, more virulent in one epidemic than in another.

Some writers maintain that the location of the initial lesion has some influence on prognosis. Thus it is said that extra-genital infection, more particularly a "cephalic chancre," is more apt to be followed by severe syphilis than when the inoculation is upon the genitals. The statement lacks sufficient confirmation as well as inherent probability.

Another point to be considered in connection with prognosis is the duration of the primary period. It has been observed in malignant forms of syphilis that the symptoms generally are precocious. Inasmuch as the power of resistance to the poison with which the organism is infected is weak, the manifestations of constitutional disturbance are hastened in their appearance and the stages of latency or incubation are shortened. Likewise has it been observed that when the advent of secondary symptoms is delayed these are apt to be light in character. The relation here implied is far from being a constant one. Other circumstances influence the duration of incubation quite as much, perhaps, as the gravity of the disease. Some of them have been referred to above. Nevertheless, we are justified on the whole in regarding a prolonged primary period as a favorable element in the prognosis; a short duration of this period as an unfavorable one.

The effect of treatment during the primary period of syphilis upon the future course of the disease, though a question of far-reaching importance, is one about which there is the greatest divergence of opinion. It is admitted pretty generally that by antisyphilitic treatment the severity and duration of the local manifestations of the primary period may be greatly modified, and also that by the same means the appearance of the

secondary symptoms may be delayed. By antisyphilitic treatment
meant only such measures or such medication as are designed to affe
the course and character of the disease directly, and not those that a
merely preparatory or palliative. Now, while it is generally concede
that antisyphilitic treatment in the primary stage may be effective i
hastening the involution of the induration and of the local adenopath
as well as in delaying the advent of constitutional manifestations, it
denied by many that the general result is an unqualified advantage. I
the first place, there are those who are averse to the early use of me
curial treatment, for the reason that it is apt to derange the norm
evolution of the disease and so render the outbreak of symptoms irreg
lar and uncertain, and thereby postpone a confirmation of the diagnosi
The apprehension has been expressed also by some others that, in repres
ing the outward manifestations of infection, we are risking a more ser
ous implication of internal organs. Thus, Jullien concluded from certai
statistics that late lesions of the nervous system, and also of the testicl
were especially liable to occur after mercurial treatment in the primar
stage. He states that, while ordinarily the so-called tertiary symptom
occur within the first four years of the disease and after that period a
comparatively rare, he found that, in those cases that had been treate
with mercury in the primary period, the gravest symptoms occurre
from the fourth to the fifth years. He concludes, therefore, that t
employment of mercury at the start tends to delay the symptoms, n
only of the secondary but of the tertiary period as well; that in som
cases it may entirely prevent them, but that when they do occur they a
more severe. Diday has published statistics of similar import, thoug
they would tend to show that the early secondary symptoms, as well
the tertiary, are severer in cases treated during the primary period tha
in those that were not. Of seventy-four cases of syphilitic chancre, fort
nine received no mercurial treatment. In these, secondary symptoms a
peared after a mean average period of 43·23 days. In twenty-five treate
with mercury, the average period before secondary symptoms was 49·
days. In the forty-nine cases not treated, the immediately followin
symptoms were slight in seventeen, moderate in twenty-seven, and seve
in five. In the twenty-five treated, the syphilis was slight in six case
moderate in fourteen, and severe in five. But statistics on such a sma
scale are notoriously inconclusive and sometimes misleading. There
certainly an inconsistency in the idea that the same remedy, whose co
stant employment during the years of the constitutional disease is a
cepted without demur, should be shunned during the month or two
primary syphilis because of supposed dangerous after-effects. This muc
is pretty certain, at all events, viz., that antisyphilitic treatment durin
the primary stage of syphilis is not an indifferent factor in the prognos

of the consecutive course of the disease; that it may to a certain extent retard its symptoms and disorganize its regular course.

THEORY OF PRIMARY SYPHILIS.

What relation do the pathological changes of this period of syphilis bear to the constitutional infection and the general disease? Are the manifestations of primary syphilis merely symptoms of a general infection already an accomplished fact, or do they represent rather a local tissue infection of which the general infection is the subsequent effect through a process of gradual diffusion? The theory which the writer advocates was set forth in a paper (On Preventive Treatment in Primary Syphilis, New York Medical Journal, March 24, 1888) read before the Academy of Medicine a few years ago, and its most essential points as then stated are here reproduced.

All the more obvious signs in the clinical history of the initial stage seem to imply that general infection does not take place immediately, but that there is a temporary sojourn of the syphilitic virus in the region where first implanted. After the virus has been inoculated there ensues a period of apparent quiescence of several weeks' duration, when, little by little, there begins at the inoculated point an indurated growth that essentially consists of inflammatory granulation tissue, answering in its general character to an irritative lesion provoked by the presence of a foreign and disturbing element. This growth is the "initial lesion" of syphilis. Simultaneously with this, or shortly following its first appearance, the nearest lymphatic glands become swollen and indurated in consequence of a cellular growth of a corresponding character to that of the initial lesion. These local manifestations remain for a considerable period the sole evidences of disease, till finally, at the expiration of this period, with more or less sudden onset, the symptoms of general or constitutional syphilis make their appearance.

The simplest and, it seems to me, the most rational explanation of this course of events is that the virus, when first implanted in the tissues, does not immediately pass into the general circulation, or what portion does is insignificant; that, mainly at least, it is at first confined to the spot where the future chancre is to develop; that here, finding a favorable soil, it grows and slowly increases till its intrusive presence becomes a source of offense to the tissue harboring it, and gradually inflammatory reaction results. From this source of generation the virus contaminates, sooner or later, the nearest lymphatic glands, which in turn become other sources of supply, till finally from these multiple foci the whole organism becomes infected. According to this, the main route to the general circulation is by way of the lymphatics and through the *receptaculum chyli*.

To this view Auspitz has opposed certain objections. Within the initial lesion, he says, the lymphatics show comparatively little chang while the walls of the blood-vessels are commonly implicated and the caliber is often occluded. The so-called "lymphatic cord," that is oft felt along the dorsum penis, is attributed wholly to the thickened bloo vessels. Furthermore, it is objected that, between the chancre and t *receptaculum chyli*, the chain of indurated glands has not yet been show to be continuous and complete.

That the lymphatics in the primary induration are but slightly affe ed, may perhaps be the very reason why their absorbent function is n disturbed. Through their patulous channels the virus would find a w of ingress which is denied it by the occluded blood-vessels. Moreove the intimate connection of the adventitia with the lymphatic system wou easily account for the marked implication of the vascular walls and for t lymphatic cord.

The objection that the lymphatic chain is not continuous is apparent based upon certain pathological specimens, more particularly those in t *Musée de Lourcine*, already referred to. In these cases the lumbar glan were not found enlarged. But it is possible enough, that had the patien lived they would haye been affected next, and the process would ha been gradually extended to the receptaculum. Or, on the other han even should general syphilis supervene before all the glands in order h been affected, it would not prove that the virus had traveled by anoth route than the lymphatic. It is not the view maintained here that t lymphatic ganglia serve as barriers to the general infection in the sen that they can not be traversed till they are themselves affected and di eased, but rather that each, as it is infected in turn, becomes a new ge erator of virus, and when all the sources of supply, whether few many, have delivered more of the poison into the blood than the syste can tolerate, it is then that constitutional syphilis declares itself.

Thus far, indeed, the pathological conditions seem to imply that syphilis the disease advances by way of the lymphatics in a manner th is analogous to the diffusion of the malignant tumors. Whether, ho ever, in syphilis the contamination advances by such regular approach from one gland to another that any definite interval can be said to exi between the affection of one gland and that of the next in succession, very doubtful. Usually, as soon as the inguinal adenopathy can be ma out at all, at least three distinctly enlarged glands can be felt. Wheth several are really affected simultaneously at the start—and, if so, ho many—we have no definite knowledge. With regard to the specime above referred to, we may surmise that the affection of the iliac glan took place subsequently to that of those in the groin, but of this we ha no evidence.

In the indications thus far presented we find nothing incompatib with the supposition that during the primary period of syphilis the disease is localized within the vicinity of the point of inoculation. But the view is current among many syphilographers that the manifestations of this period are always anticipated by infection of the general system, of which they are only prodromal symptoms. According to this position, directly upon its inoculation the syphilitic virus passes into the general circulation. The apparent quiescence at the point of inoculation is real quiescence. The incubation pertains not to any *materies morbi* in that vicinity, but to something in the blood, and the initial lesion is the first tangible sign of the blood disease, reflected in some arbitrary and inexplicable manner to the spot where the virus effected its original entrance. It is very strange, it must be observed, that the second transit of the virus through this region should produce such decided effects, while at the first the tissues suffer its passage and betray no resentment whatever.

Two facts are alleged concerning the primary stage of syphilis, upon which the theory of the symptomatic character of the initial lesion is based. The first is, that an individual who has been inoculated with syphilis has always acquired immunity from any subsequent inoculation of the syphilitic virus before the chancre develops; and the second, that extirpation of the chancre does not prevent the regular course of the disease.

That there is a period within a certain time after inoculation when the tissues are not refractory to a second implantation of the virus, is shown by the fact that, when a second or third inoculation takes place within a short period from the first exposure, successive and multiple chancres result. The immunity is therefore not established at once. But it is maintained that, after the chancre has once formed, constitutional infection is an accomplished fact and the immunity is then complete. In verifying this point one important consideration must not be lost sight of, viz., the length of time it requires for the chancre to develop. The second inoculation might have its effects forestalled by constitutional infection intervening before the completion of its incubation, even though at the time of this second inoculation no general infection existed.

It must be admitted as a fact, however, that auto-inoculations and reinoculations during the primary period of syphilis, as a rule, produce no specific effect except when performed very early. Reinoculations following the first exposure at a short interval are tolerably sure of being successful, while auto-inoculations from the chancre are very rarely so, and then only, in all probability, when made sufficiently early to allow their periods of incubation to elapse before the advent of the secondary stage of the disease. It may be conceded, furthermore, that in the majority of cases immunity *does* precede what is known as secondary syphilis. From the materials at our command it seems not improbable that a slight degree of general infection may exist in primary syphilis which, though sufficient confer immunity upon the individual from any second installment of virus, is yet insufficient to cause general disease. It does not suffice arrest the progress of the growth and dissemination of virus at th points where depots have already been established, but it may act as effective injunction against the establishment of any new depots. have a notable illustration of such an immunity in the case of the mot of a syphilitic child who, notwithstanding she may at no time pres any outward sign of syphilitic infection, is immune from contagion a suckles her child with impunity. Moreover, there is nothing in the vi just proposed that does not accord with the results of preventive inoc tion which have been achieved, notably by Pasteur, in other infecti diseases. Practically these results depend upon the fact that the infect that is superinduced artificially is in a mitigated form. It may be p sumed that the attenuating process to which the virus is subjected bef its inoculation so modifies its power of reproduction that when it ent the body it produces itself only to a comparatively slight extent, whi though sufficient to modify the tissues in such a way as to render th insusceptible to another inoculation of the same virus, causes no mani tation of virulence. Is it not possible that in the initial stage of syph similar conditions prevail?

It can not be said that the results of excision make conclusively eit for or against the hypothesis of the local character of primary syphi But even were it shown that extirpation of the chancre did not prev the course of general infection, it would not thereby be proved that initial lesion was merely a symptom of the constitutional disease, would it prove that the syphilitic process was not essentially local in t period. We must not lose sight of the *rôle* played by the lymphat As a manifestation of primary syphilis, the chancre is hardly of less portance than the indolent adenopathy. That the indurated lympha glands in the vicinity of the initial lesion are contributory sources infection, there is little reason to doubt. Were the initial lesion remo they would doubtless still suffice to contaminate the system. To the p duction of syphilis it is only necessary that the germs of the disease eff a lodgment somewhere in the tissues. The seed must then take root, a when it once begins to germinate its potentialities for infection may r sonably be supposed to be the same as those of the original implantat at the point first inoculated.

While, then, it can not be affirmed of any period in the course of malady that the disease is strictly limited to the site of the initial lesi the proposition that syphilis is essentially a local disease remains uncontroverted. The periods of incubation preceding and following development of the chancre correspond to what we may provisiona term a process of germination that takes place *in situ* and not in the general circulation. During the forming stage of the chancre, during the period of apparent quiescence, and before any changes at the point of inoculation are outwardly perceptible, certain alterations are doubtless in progress: the round cells are accumulating, the walls of the blood-vessels are being infiltrated and occluded, till at length the initial lesion is formed. Meanwhile it is not unlikely that certain infectious elements find their way in small quantity into the general circulation. A few such germs might possibly be at once destroyed or eliminated from the economy, but they would gradually increase as the initial lesion and the affected glands continually added to the supply, and, sooner or later, their influence upon the tissues would be such as to superinduce that condition or modified infection which suffices to secure immunity against reinoculation, but is insufficient to elicit constitutional symptoms. Finally, re-enforced by larger and larger incursions of infectious matter, the virus accumulates in the blood in such excess that the organism, unable to tolerate it longer, reacts with the characteristic manifestations of the general disease.

If the indications have been correctly interpreted in this theory, and primary syphilis is practically a local or rather *regional* disease, its bearing upon the subsequent events of constitutional syphilis is a much more vital matter than it would be were the manifestations of this primary period merely symptoms of a general infection already an accomplished fact. It concerns prognosis not merely as a passive index but as a determining factor.

It is implied in the theory that to produce constitutional syphilis a certain *quantity* of the poison is requisite—far more than that small modicum that is inoculated at the start, more than can be generated in the infected region within a period of time that is usually of some weeks' duration. The more rapid and the more prolific the generation in this region is, the shorter the periods of incubation, and, with much probability, the severer the syphilis. The quantity of poison, then, represents a major factor in the prognosis, though of inferior importance, doubtless, to that of individual susceptibility.

The therapeutic indications that flow from the theory are clear enough, but their practical fulfillment has been found a baffling task. The object aimed at is to so prevent or retard the production of the virus in the infected region that the point of saturation of the blood may never be reached, or at least not until its effect has been forestalled by general immunity. But to accomplish this, all the foci of infection which serve as generators of the virus in the primary period must be acted on together. It has been abundantly shown that extirpation of the one at the *foramen contagiosum*, the initial lesion proper, can not be relied on

to interrupt the disease, and to reach all the others by surgical proced
is impracticable.

Perhaps the task will be an easier one when the properties of
syphilitic virus are better known to us; when we have learned what p
ticular *rôle* is assigned to its formative element (the hypothetical ger
and what to the concomitant ptomaine; when we know what it is t
gives the tissues immunity against the effects of syphilis, and whethe
is possible by any therapeutic measures to confer this immunity or
promote its acquisition so as to secure exemption from the injurious c
sequences of the disease.

CONSTITUTIONAL SYPHILIS.

By JOSEPH ZEISLER, M. D.

While the earliest accidents due to the inoculation of the specific syphilitic virus are pre-eminently of a local character, there appear sooner or later distinct signs which show that a general infection of the whole system has taken place; and it is only when such an unmistakable general distribution of the specific poison has become manifest that we may speak of constitutional syphilis. Under this designation are comprised all the various protean manifestations on the integument, in the viscera, in fact in all the organs of the body, which may be produced in the further evolution of the syphilitic process, and which will form the subject of the following pages.

The question, When does syphilis become constitutional? can not be answered with mathematical certainty. Indeed, it involves one of the principal controversies between the so-called unicists and dualists: the former claiming that the so-called secondary symptoms only are sufficient proof for true constitutional syphilis; the latter asserting in equally strong manner that the fully developed initial lesion is already the result of a general contamination of the system. It is not my purpose, and it would lead us into the domain of theoretical speculation, to enter here upon a discussion of this very interesting but still mooted question. Actual practical observation teaches us that long before the appearance of a generalized eruption on the skin, which is usually considered as the classical sign of constitutional syphilis, there are present distinct morbid changes in many organs of the body, which demonstrate clearly that the syphilitic poison has entered the general circulation, that the disease has become constitutional. But this distribution of the virus and its products occurs in a slow, gradual manner; it requires a certain length of time before its multiplication causes a sort of explosion on the cutaneous surface, and this period may justly be called the second period of incubation.

PERIOD OF SECONDARY INCUBATION.

In distinction from all other known infectious diseases syphilis has a second period of incubation, by which is understood the time elapsing be-

tween the appearance of the primary lesion and the advent of the so-cal
secondaries—i. e., a generalized eruption and its concomitants.

The duration of this period varies within comparatively wide lim
It has been observed to last only twelve days (Gibert, Rollet, and Guent
and, again, its extreme has been found by Ricord to be even six mont
In estimating the length of this period it is of course necessary that
specific treatment should have been administered, and that the time of
appearance of the initial lesion, as well as that of the first manifestat
of generalized syphilis, are carefully noted. Diday, who thus recor
fifty-two cases (Nouvelles Doctrines sur la Syphilis), found its aver
duration to be forty-six days. Extensive statistics made by Guentz furn
the same result. Judging from a great number of observations,
period of secondary incubation may be stated to last, as a rule, about
weeks. Various influences may cause exceptions of this rule. Thus
mund (Wiener med. Wochenschrift, 1878, No. 21) found that in ol
people the secondary eruption may be delayed by from three to f
weeks. On the other hand, it has been found that all such fac
which tend to cause so-called malignant syphilis — as, for insta
lymphatic habitus, scrofulosis, defective nutrition, pregnancy, chr
alcoholism, carelessness, dissipation, etc.—may also accelerate the o
of the consecutive symptoms.

It might be mentioned in this connection that, according to Key
observation, the whole period of secondary syphilis may in some insta
be skipped, and that only after a very long interval, sometimes lasting
several years, is the chancre followed by tertiary symptoms. These
of course, extremely rare cases, but, coming from such a reliable sou
can not be confounded with the many cases where the appearance of r
secondaries has simply been overlooked by the patient, or even by
physician. Nor should we forget that the early administration of a
syphilitic treatment is so often responsible for the delayed appearanc
constitutional symptoms.

It has been stated already that during the period of secondary i
bation a slow and gradual dissemination of the syphilitic poison t
place in the general system; but the channels through which that po
travels, starting from its original abode, the chancre, are not absolu
known. Auspitz believed that the peculiar endarteritis found by
and Unna in the chancre pointed to the blood-vessels as the way of p
agation, and that the implication of the lymphatics is already the re
of the general intoxication. But E. Bumm (Viertelj. f. Derm. und Sy
1882, p. 259) remarks, very justly, that the endarteritis, the clogged
dition of the small blood-vessels, rather acts as an impediment against
progressive march of the infectious material, while the widely open
phatic spaces allow its easy passage. It might appear very plausibl

assume that from the seat of the inoculation the virus wanders to the neighboring lymphatic glands, causing the typical indolent bubo, and that in turn the more remote glands are successively invaded by way of the lymph-vessels until the ductus thoracicus is reached, through which the poison enters the general circulation. But more recent careful examinations, to which special reference will be made later on, show that, long before the general lymphadenitis is established, distinct morphological and chemical changes are manifest in the blood. It is therefore most probable that lymph-vessels and blood-vessels, both, furnish the road through which the specific virus reaches the system at large.

PRODROMATA.

The gradual intoxication of all the tissues of the body is accompanied by sufficiently distinct clinical signs, which at first being hardly noticeable, become toward the end of the incubation period so pronounced as to constitute the so-called prodromata of syphilis.

True enough, many patients reach the stage of a generalized syphilitic eruption without having experienced for a moment the slightest indication of being sick, and in some cases it is only then that their attention is called by the physician to the existence of the chancre; but these are exceptions. As a rule, the first two or three weeks after the manifestation of the primary sore are free of characteristic clinical features. After this, and particularly during the two or three weeks preceding the appearance of the exanthem, a number of subjective and objective symptoms become quite marked. The cutaneous integument shows a sallow, pale, leaden appearance; the expression of the face is sorrowful; the eyes look tired as from dissipation or deep grief; the patient feels uncomfortable, unhappy, dejected. His sleep is disturbed; the appetite diminished or lost—occasionally, however, increased to a sort of "bulimia"; indistinct rheumatoid pains in the bones and muscles, particularly toward night, or a general lassitude, are often complained of. Headache is a frequent symptom. It may be continuous and of slight severity, but more often becomes so painful toward night as to keep the patient awake. This is the nocturnal cephalalgia so characteristic of this period. The seat of the headache is frequently the frontal region, or again it may be confined to the occiput; occasionally it reaches from one ear to the other over the vertex, or there is a feeling of painful constriction around the head. These headaches assume often a quotidian type, beginning at a stated hour during the evening and vanishing toward morning. So typical is this occurrence at times that one might be inclined to combat the pain by quinine and the like, but it is only the general constitutional treatment which brings relief. Lang (Viertelj. f. Derm. und Syph., 1881, p. 461) has shown that in many cases this headache, accompanied by vertig nausea, and similar subjective symptoms, can be traced to meninge irritation, which is manifested through the ophthalmoscope by a marke hyperæmia in the retina, though there is no apparent disturbance vision. These observations were fully confirmed by Schnabele. Oth neuralgic pains are occasionally observed, particularly in localities whic previously were the seat of some irritation (Vajda, Viertelj. f. Derm u Syph., 1875, p. 147).

As more unusual features might be mentioned a painful swelling the frontal region, the parietal bones, or the clavicle; effusions in t knee and elbow joints, or some of the smaller ones, as the phalange joints—features which may closely simulate acute articular rheumatis but are quite refractory to treatment based on such a diagnosis.*

These premonitory symptoms are usually accompanied by changes the temperature and the pulse. Of these we shall speak separately lat on, as well as of the general lymphatic engorgement.

As in some other infectious diseases, an enlargement of the spleen h been observed toward the end of the incubation period; it is by no mea a common occurrence, but sufficiently frequent as not to be regarded as mere casual coincidence. A. Weil (Centralblatt f. d. med. Wissenscha en, 1874, No. 12) reports three cases of recent syphilis wherein he det mined the splenic tumor by percussion and palpation. Avanzini (Vierte f. Derm. und Syph., 1884, p. 379) noticed it previous to the eruptive sta in eight out of thirty cases. Woelfert (Monatsh. f. prakt. Derm., 18 p. 81), however, observed it in only sixteen out of four hundred a ninety cases. Schuchter, Wever, and M. Zeissl also furnished seve observations. The enlargement takes place either gradually, or, duri a fever paroxysm accompanying the eruption, more abruptly, and so times causes a painful sensation. Under constitutional treatment t swelling is promptly reduced. We may well look upon the splenic swe ing as an analogon to the general ganglionic enlargement.

Another rather unusual symptom associated with early constitutio syphilis is hepatic icterus, which, according to Engel-Reimers (Monat f. prakt. Derm., 1892, xv, No. 10), has been observed in about two per ce of all cases. Ricord first mentioned it in his Clinique Iconographique, a Gubler, Lanceraux, Fournier, Hutchinson, and recently Chapotot, ha reported well-observed cases. The liver is found to be slightly enlarg but occasionally the swelling is quite considerable. It is painful to pressure. The fæces are clay-colored, which distinctly points to a biliary congestion.

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* It is a strange coincidence that just at the time of this writing I have the opp tunity to observe, for the first time in my experience, a classical case of this kind. young man recently infected, in whom an effusion took place into the bursa olecrani so weeks ago, shortly before the appearance of a syphilitic roseola; the swelling became qu marked and painful, and finally the exudate, consisting mainly of synovial fluid, made way through the skin, exposing the synovial membranes.

The cause of this jaundice has been the subject of much dispute, but Lanceraux's explanation seems most plausible. He declares it as the result of the compression of the ductus choledochus through enlarged portal glands. This has been verified by a few *post-mortem* examinations. Syphilitic jaundice yields very readily to mercurial treatment.

Albuminuria also has occasionally been observed during this period, though authors differ very much as to its pathognomonic importance. Since Fournier reports that for two years a careful analysis of the urine was made in all his patients affected by recent syphilis, and that albumin was found in only one case, we may well conclude that it is too uncertain and rare a symptom to deserve more than perhaps a scientific interest.

The same may be said of the observations of Finger (Viertelj. f. Derm. und Syph., 1881, p. 255), who found an accentuation of the cutaneous and tendon reflexes shortly before and during the appearance of the cutaneous eruption. He concludes therefrom that very early during the syphilitic process the central nervous system participates in the general intoxication of the system. And there are some other similar observations which lend weight to such opinion. Bulkley (Archives of Dermatology, 1879) and Fournier noticed that at this early period, particularly in women, there were distinct changes in the sensibility of the skin—a generalized or localized paræsthesia and even complete anæsthesia, or, again, analgesia of different grades of severity.

We may well raise the question here, What is the pathological basis of all these prodromal symptoms and conditions? Assuming that syphilis is a disease due to the invasion of a specific organism—a fact not absolutely proved, but at least highly probable—does it seem likely that those rather uncertain and ephemeral alterations in the general economy are already the result of the topical effect of bacteria? This seems hardly probable. But modern bacteriology teaches us that, besides the direct local action of microbes, we must also take into consideration the effects of their tissue changes, their chemical products, the different ptomaines and toxines, leucomaines, etc. Finger has shown, in an admirable paper (Arch. f. Derm. und Syph., 1890), how all the manifestations of syphilis can be traced on the one side to the direct topical effect of the supposed microbes, or on the other side to the remote effect of their chemical products; and to these latter he attributes all the prodromal symptoms. This may seem only theory, but it surely is a plausible one, and explains in a natural manner the pathology of the incubation period.

STATE OF THE BLOOD.

The general character of the syphilitic process has long ago point to the fact that the blood takes part to a considerable degree in the m bid changes which in other organs are so apparent. The experience t the blood of a syphilitic person could become the carrier of contagi contributed in no small degree to that theoretical presumption. C knowledge of its finer chemical and morphological alterations in this c ease are, however, of rather recent date. But although modern his logical researches have taught us a great many new facts concerning condition of the blood in syphilis, we have not found in it, up to t date, the true materies peccans.

The first thorough work in this direction was undertaken in 1844 Grassi, a pharmacist in the Hôtel Dieu, under the instigation of Ric (Leçons sur le Chancre, 1860). He found a diminution of the red blo corpuscles, which was especially marked in the case of women; he served it already in an early stage of the disease, and noted the impro ment under the use of iodides. His results were confirmed by seve authors, notably by Wilbouchewitch (Brown-Séquard's Archives de ph ologie, 1874) and Keyes (Transactions Int. Med. Congr., Philadelp 1877, p. 726), who called special attention to the beneficial influence what he termed the "tonic dose" of mercury. Later investigators ferred particularly to the condition of the hæmoglobin. Of the la number of workers who published special monographs upon the sub within the last few years may be mentioned Lezius (Blutveränderun bei der durch Syphilis bedingten Anaemie, Inaugural Dissertat., I pat, 1889), Carl Dehio (Petersburg. med. Wochenschr., 1891, No. Bieganski (ref. in Monatsh. f. prakt. Derm., 1891, p. 345), L d'Amore, ibid., 1892, p. 417), I. I. Antz (ref. in Annales de Derm Syph., 1891, p. 237), and Stoukovenkoff (Annales de Derm. et Sy 1892, No. 8). The examinations referred to by this latter author v conducted by his assistant, Dr. Jellenew, in a very careful manner, twenty patients in different stages of syphilis, and an abstract of his clusions is given in the following:

A. PERIOD OF INCUBATION.

1. The modifications in the quantity of the oxyhæmoglobin, the and the white blood-corpuscles are observed long before the appear of any cutaneous eruption (for instance, twenty days before).

2. As a rule, the decrease in the percentage of the oxyhæmoglobi evident during the whole duration of the second period of incubatio sixteen out of twenty patients).

3. The number of the red blood-corpuscles diminishes in propo

to the oxyhæmoglobin, ordinarily a few days after this has commenced to decrease.

4. The increase in the number of the white blood-corpuscles takes place during the period of second incubation. This may be the first manifestation of the syphilitic dyscrasia in the blood, and precedes usually the decrease of the oxyhæmoglobin and the red blood-corpuscles.

5. These alterations in the blood appear in greater intensity during the fever paroxysms which occasionally announce the cutaneous eruptions, and may be considered as a sort of aura or foreboding.

B. PERIOD OF SYPHILODERMATA.

6. In the course of the syphilitic eruptions (roseola, papules, pustules) the percentage of the oxyhæmoglobin and the red blood-corpuscles continues to diminish in the measure that the white blood-corpuscles increase in number.

7. Whenever the eruption is accompanied by fever the decrease of the hæmoglobin is more evident—about four to six per cent. The diminution of the hæmoglobin and the red blood-corpuscles remains stationary and at its maximum point during the whole period of the eruptions; but they may decrease still further, if no specific treatment is administered. With the gradual disappearance of the cutaneous symptoms, the percentage of the hæmoglobin returns by and by to its normal state; but it may decrease again, even independently of any new manifestations of syphilis.

8. Where no specific treatment is administered, and when repeated outbreaks follow the original eruption, a new decrease in the oxyhæmoglobin can be observed.

9. During the whole duration of the eruptions the quantity of the red blood-corpuscles is diminished. This is most marked during the first days of an eruption, and whenever such an eruption is most intense.

10. The decrease of the oxyhæmoglobin and of the red blood-corpuscles is always proportionate.

11. Before a relapse of the eruption, especially when fever is present, the number of the blood-corpuscles decreases, even more so than during the original eruption.

12. In untreated cases it is rare to observe an increase in the number of the red blood-corpuscles after the vanishing of an eruption.

13. The number of the white blood-corpuscles is doubled in all cases during the cutaneous eruption. Occasionally the increase is still more marked.

14. This increase of the white blood-corpuscles sometimes takes place very rapidly during new outbreaks or during an exacerbation of an eruption, even when no enlargement of the superficial lymphatics can be detected.

15. During the disappearance or after the attenuation of the eruptio no distinct changes are noticeable in the relative number of the whi blood-corpuscles in cases treated by daily subcutaneous injections of tl benzoate of mercury.

16. Six to seven hours after the first injection of this kind there is constant increase apparent in the percentage of the oxyhæmoglobin ar the number of the red blood-corpuscles, as well as a decrease in the nur ber of the white blood-corpuscles.

17. Under the influence of the first six to sixteen daily injections tl percentage of the oxyhæmoglobin becomes gradually normal; in case however, which are complicated by fever, diarrhœa, etc., it decreases spite of such treatment. The continuance of the injections beyond tl number of sixteen is always followed by a gradual decrease of the hæm globin.

18, 19. Similar observations were made concerning the red blood-co puscles.

20. After the cessation of the mercurial injections the number of tl white blood-corpuscles decreases usually, but later on it increases again.

Two valuable contributions to the subject were made during the r cent Dermatological Congress, held at Vienna, September, 1892, one b Konried, on the quantitative changes in the blood of syphilitics, the oth by Rille, on the morphological changes. The investigations of Konri strengthen very much some of the above-quoted statements, and emph size the decrease of the tinctorial power of the blood by ten to twenty p cent, before any change in the number of the red blood-corpuscles noted, and long before the advent of apparent generalized symptom Even robust individuals showed these alterations. With the progress the disease the amount of the hæmoglobin continues to decrease, eve after mercurial treatment has been instituted. Only with the disappea ance of the florid manifestations on the skin, and after twenty-five thirty mercurial inunctions, the hæmoglobin reaches normal figures. continuance of this treatment, however, produces in most cases by n means an improvement; on the contrary, the color index of the bloo shows another decrease, which must be regarded as the result of the d structive effect of too large doses of mercury. In the later periods the disease grave manifestations may be associated with such enormo decreases in the amount of the hæmoglobin as forty-five per cent; an in such cases proper specific treatment and ideal hygienic conditions ma perhaps tend to increase the number of the red blood-corpuscles even normal figures, but are unable to perceptibly improve the quality of tl blood as regards its tinctorial constituents.

These serious alterations are also noticeable in cases of tertiary syph lis which had not been treated; but in general the blood suffers less i tertiary syphilis than in other organs, though its morbid changes are of a more lasting character. Konried concludes from his researches that the principal alteration of the blood in syphilis constitutes an oligochromæmia.

Rille supplements these results, and shows that with the appearance of cutaneous phenomena and the generalized lymphatic engorgement there is a distinct increase of the leucocytic elements. He found—

1. Increase of both varieties of the so-called leucocytes.
2. Increase of the eosinophile cells, particularly during a papular eruption. Their number corresponds with the extent of the efflorescences on the skin.
3. Considerable increase of the transitory forms and the large mononuclear leucocytes.
4. As an inconstant appearance he found, especially in very pale female subjects, the so-called myeloplaques, or Cornil's myelogenic cells.

These alterations improve with the disappearance of the cutaneous symptoms and under proper treatment. He attributes the presence of the eosinophile cells, among other causes, particularly to the lesions on the skin, which appears quite plausible from analogous results in different nonspecific skin disorders. The other changes are explained through the lymphatic implication, as well as the insufficient nutrition of the system.

We see from the foregoing observations that the pathological condition of the blood in syphilis is somewhat complex. We find features in it characteristic of oligocythæmia, and again such which are present in leucocytosis. Finally, the changes in the tinctorial elements of the blood are indicative of chloræmia or oligochromæmia.

There is nothing in these conditions that can be called absolutely characteristic of syphilis, but they demonstrate clearly the active participation of the blood in the syphilitic process; and the above investigations show the beneficial influence of specific treatment upon the same, and ought to forever establish the fact that the period of second incubation belongs essentially to constitutional syphilis.

SYPHILITIC FEVER.

It has been mentioned already that elevations of the temperature constitute a frequent prodromal symptom in syphilis. During the further progress of the disease syphilitic fever occurs also quite often. It has been the subject of considerable investigation, and among the authors who furnished the most valuable results may be mentioned Fournier, Lanceraux, Bäumler, Bumstead and Taylor, and more especially Guentz and Vajda. While the existence of genuine syphilitic fever is generally admitted, it is by no means a constant symptom in all cases. Its occu rence, and still more its intensity, seem to depend very much on the c existence of local morbid processes in different parts of the body. Wheth the syphilitic virus, as such, is capable of directly producing fever is b no means settled. From clinical observations this would seem rath doubtful, for its absence during the earlier part of the incubation perio and often during the florid stage of the disease, is contrary to such a vie It seems more natural to look upon syphilitic fever as a symptom depen ing upon other manifestations. In this way we can understand that syph litic fever usually accompanies or precedes in a very marked degree th first outbreak of cutaneous syphilis; that it often shows itself again wit every renewed eruption on the skin during the whole course of the di ease; that ulcerative and pustular lesions go along with higher temper tures than papular ones. In how far ptomaines and toxines may be r sponsible for the production of fever can not be ascertained in our pre ent state of knowledge.

Guentz has expressed it as his opinion that syphilitic fever is foun in only twenty per cent of all cases of syphilis. This estimate is surel too low, for careful thermometrical measurements will reveal more or le increase of the temperature in a large majority of all such patients one or another period during the disease. The fever may, however, b so slight, and what is more important, may be associated with such triflin subjective complaints, that it is easily overlooked. In other cases it ma again be so intense, and by its type simulate other febrile diseases in suc a striking manner, that errors in the diagnosis are by no means rare. myself have met with several cases which were regarded and treated a typhoid fever for quite a while before the generalized eruption at las cleared up the scene. Such errors are quite pardonable, when we remen ber how apt our patients are, even those in the better walks of life, to con ceal a venereal sore before their physician, thus justifying the old Lati proverb, "Omnis syphiliticus mendax."

Concerning the type of syphilitic fever, Fournier distinguishes thre principal forms: 1, intermittent type; 2, continued type; and 3, vagu irregular type. He also mentions a kind of syphilitic typhoid. The firs two forms are those most often met with.

Fever occurring during the earlier part of the incubation period is as a rule, only a concomitant of suppurative or phagedenic processe about the chancre or the corresponding bubo. The classical form o syphilitic fever occurs as a precursory symptom of generalized cutaneou manifestations, and has been termed by Guentz the eruption fever. I usually shows a continuous type. Vajda observed it even ten to twent days prior to the eruption, and Yeo mentions temperatures of 104° to 106 Fahr. several weeks before, but Fournier limits this to a much shorte term. Only in rare cases the fever reaches over 104°; usually it keeps itself at about 101° to 102° Fahr. The evening temperature is, as a rule, about one degree higher than that in the morning. With the advent of the cutaneous eruption the fever reaches its acme, and then decreases either gradually or even abruptly. The general symptoms accompanying it have mostly been mentioned under the head of Prodromata. The eruption fever is usually more marked in weak and debilitated subjects, and, as Fournier first pointed out, more so in women than in men.

Of the fever occurring later on it may be said, in general, that its intensity shows an indirect proportion to the period of the disease—i. e., the longer the syphilis has lasted the milder will be the fever. Recurrent cutaneous manifestations are announced by only a slight rise of the temperature, not more than one to two degrees.

The papular syphiloderm is neither at its outbreak nor during its further existence associated with much febrile disturbance; only the outcropping of new lesions may cause a rise of the temperature by about two degrees. The pustular syphilide, however, is almost always accompanied by considerable fever of a distinctly remittent type; it may reach toward evening 102° to 104°, and is reduced in the morning by about one to two degrees. This higher and more intense fever finds sufficient explanation in the fact that the pustular syphilide occurs, as a rule, only in miserable, ill-fed, cachectic subjects.

Complications on the part of the mucous membranes, swollen or ulcerated tonsils, suppurating lymphatics, or the formation of abscesses in any part of the body, will naturally produce considerable febrile reaction.

During the later stages of syphilis, particularly the so-called tertiary period, fever is rather uncommon, and, as will appear from the previous remarks, is then usually a concomitant of some local destructive process.

Little attention seems to have been paid, up to now, by authors, to the existence of fever in hereditary syphilis; some make no mention of it, others speak even of subnormal temperatures. In a recent paper on the subject, I. Erös (Monatsh. f. prakt. Derm., 1891, p. 420) states that in the newborn the development of specific lesions on the skin and mucous membranes is accompanied by simultaneous fever of a continuous or intermittent type. It reaches from 100° to 102°, rarely more.

The pulse in syphilitic fever is not always in proportion to the temperature, and its rate rarely reaches over 110 per minute.

The diagnosis of syphilitic fever ought to offer little difficulty to the careful and observing physician.

In the treatment, the ordinary antipyretics will be found rather ineffective, while mercury exercises a remarkably beneficial influence, particularly in the earlier periods of the disease. This prompt controlling influence of mercury upon syphilitic fever is perhaps the reason why a few observers are somewhat skeptical as to its existence, particularly thos who are in the habit of beginning the treatment very early and thus disturb the natural evolution of the disease.

In his monograph on syphilitic fever (Viertelj. f. Derm. und Syph. 1875) Vajda has paid particular attention to the tissue metamorphosis i syphilitic subjects. Contrary to expectations, he found very few noteworthy changes in the urine, at least nothing that in any way could b claimed as characteristic of syphilis.

AFFECTIONS OF THE GANGLIA.

One of the most important symptoms of constitutional syphilis, on which in doubtful cases is often the decisive factor for the diagnosis is the swelling or infiltration of lymphatic glands in certain typical localities near the surface of the body. We do not refer here to the peculia isolated glandular induration near the seat of the infection—the indolen bubo; this has been treated of in a preceding chapter. We speak her of the more universal glandular engorgement which is a later and mor characteristic feature of the disease. It occurs, as a rule, toward the latte part of the period of secondary incubation, sometimes even two to thre weeks before the appearance of the cutaneous eruption. At first indistinct, and gradually becoming more marked, this glandular swellin shows itself at its height of development with or soon after the eruptio on the skin. It is surely one of the most frequent symptoms of generalized syphilis, and Ricord called it the most constant, the earliest, an the most characteristic sign. A careful examination will rarely fail t discover it in florid cases in some places at least. While there are goo reasons to believe that the whole lymphatic system participates in th general infection, the theoretical supposition that all the different gland should be in a state of pathological alteration is by no means borne ou by clinical observation. The intensity and extensiveness of the glandula engorgement depend upon several circumstances. Individual disposition surely plays no small part in this. We know that some persons develop lymphatic swellings from trivial causes—a slight traumatism, irritation of the skin through scratching on account of some skin trouble slight angina, etc. Such patients will surely respond to a syphilitic infection with a marked lymphadenitis. The degree of severity of th disease in general is another determining factor. With a very excessiv cutaneous eruption, with ulcerations in the throat, with marked cachexia we shall almost invariably find very pronounced glandular trouble. B this we wish by no means to convey the idea that lymphatic engorgemen is only a symptom, a reaction following, or depending on, a morbid process in a neighboring part. Such statements have—to our mind erroneously—been made even by such authorities as Diday and Auspitz. They are untenable on account of the undeniable fact that, as mentioned before, the glands are often affected long before the eruption is present. And we have observed two cases of unmistakable syphilis without any cutaneous manifestations whatever, but sufficiently clear through the chancre, the generalized lymphatic engorgement, and an alopecia.

The glands most commonly affected are those situated around the neck, particularly those on the posterior border of the sterno-cleido-mastoid muscle, the jugular and supraclavicular, the axillary glands, and those inguinal glands which were not primarily infiltrated. Sigmund used to attribute particular diagnostic significance to the enlargement of the epitrochlear glands. These are situated two or three fingers above the internal condyle of the upper arm in a sulcus between the biceps and triceps muscles; usually there is only one gland to be noticed, but sometimes two, or even three, united by intervening indurated lymphatic chords. Taylor doubts the pathognomonic importance of these glands, and Dietrich (ref. in Viertelj. f. Derm. und Syph., 1888, p. 309), who made careful statistical observations on the condition of the ganglia in syphilis, found them in only seventy-two per cent of his cases. Gruenfeld (Wiener Med. Presse, 1876, No. 10), again, who made a special study of this question, confirms Sigmund, and claims to have found them without any exception at certain periods of the disease. It is perhaps well to remark that the palpation of the cubital glands requires some degree of dexterity; it is necessary to bend the arm in the elbow-joint, slightly adducting it, and to feel for the glands by placing the hand around the outside of the upper arm and gently inserting the finger-tips into the sulcus.

It is quite common to find ganglionic enlargement behind the ears, one or two glands firmly attached to the posterior border of the mastoid process. The submaxillary, the submental, the occipital, and the femoral glands are also quite often in a state of tumefaction. In rare cases the intervening lymph-vessels may be found in a state of induration, according to Koebner.

These glands attain the size of a small pea to that of a hazelnut, but occasionally get as large as a pigeon's egg. In well-pronounced cases they are not only easily felt, but may be noticed even at a distance as small protuberances. This is especially the case in patients with a thin adipose layer. In those with a rich paniculus it is sometimes quite difficult to find them, even by careful searching. They are always quite painless, indolent, and only upon strong pressure a disagreeable sensation may be created. They are roundish or ovoid, and usually movable beneath the skin. They remain in this state of engorgement during the florid stage of the disease, and gradually terminate in perfect resolution. Mercurial treatment is a powerful aid to make them disappear along with the other symptoms of syphilis. Only in exceptional cases one another gland, most often the inguinal, will remain enlarged even f years. Suppuration of syphilitic ganglia is a very rare accident, and then brought on not by the original disease, but by complicating scrof losis or some form of extraneous local infection.

The diagnostic value of ganglionic enlargement is quite considerab but is often overestimated. The presence of numerous palpable glan in connection with other important signs of syphilis forms strong po tive evidence. But their absence can not be used as equally strong neg tive evidence, for we have seen that they occur regularly only in the l ter part of the incubation period and the directly following active sta of the disease. To look for them in later periods, particularly when te tiary forms are manifest, with a view to strengthen the diagnosis, is least useless; and we have never a right to declare that a patient is fr from syphilis, on account of our inability to detect anywhere the slig est trace of former glandular swelling. On the other hand, it is perha a still greater mistake to base the diagnosis of syphilis on the fact th one or another isolated gland is noticeably enlarged; for it should n be forgotten that in otherwise healthy persons a careful examination w very often reveal some enlarged ganglion as a residuum of some form nonspecific trouble. Dietrich has through his above-mentioned inves gations reached the surprising result, that of 439 healthy subjects whi formed the basis of his statistics, 99 per cent had perceptible glands one or another part of the body. He could feel the cervical and sup clavicular glands in 79 per cent, the axillary glands in 72 per cent, t cubital glands in 82 per cent, and the inguinal glands in 93 per ce If we remember how frequently infantile eczemas and many other sk diseases, affections of the throat, gonorrhœa, and a host of other troub are associated with and leave behind them more or less glandular swe ings, we shall not much wonder at these figures.

The differential diagnosis of ganglionic enlargement in syphilis fr that in other affections will rarely offer much difficulty. Scrofulo glands have not the smooth, even surface of syphilitic ones. They apt to become inflamed and tend to ulceration. The glands in Ho kin's disease form massive tumors. Those in prurigo are easily rec nized from the co-existing skin affection, and they are, as a rule, fou only in the subinguinal and femoral regions.

We have already indicated our opinion as to the pathological imp tance of this specific glandular engorgement. It is by no means the res of a sympathetic irritation induced by morbid processes in their proxi ity, but is the effect of the general specific intoxication of the whole s tem. Those ganglia are a sort of metastasis of the initial lesion. Suc view is quite plausible in the light of Bumm's investigations, who s ceeded in producing syphilitic infection by inoculation with the milky substance from one of those glands. It has furthermore been proved by several post-mortem examinations (Lancereaux, Finger), that far away from any source of external irritation visceral glands are found similarly affected as those near the integument. The deep inguinal, the iliac, the retro-peritoneal, prævertebral, mediastinal, and bronchial glands have been found to participate in the general lymphadenitis. As a rule these deeper ganglia, while often found present in the early stage of the disease, are pre-eminently characteristic for the later periods, and in a certain way they have a similar relation to visceral syphilis as the superficial ganglia have to the affections on the skin and mucous membranes.

It has been claimed by Virchow and others that the aforesaid ganglionic enlargements act as sorts of depots, from which at times the stored-up virulent matter is distributed into the general economy. Such a view might appear quite rational, and might offer a theoretical explanation for the mode of propagation of the specific poison, for the frequent relapses peculiar to syphilis, and for its chronicity; but it does not harmonize with exact clinical observations; for the softening and gradual disappearance of the ganglionic enlargement, which according to that theory ought to facilitate the dissemination of the poison, by no means causes an aggravation of the other symptoms, but, on the contrary, rather indicates and is justly considered as a very desirable sign of general improvement. It is somewhat doubtful whether the general lymphadenitis bears a causal relation to the leucocytosis peculiar to certain periods of syphilis. The above-mentioned observations as to the state of the blood by Stoukovenkoff (particularly No. 14) do not strengthen such a view, reasonable as it may appear.

The anatomy of these engorged glands shows as the essential feature a small cellular infiltration into the lymph spaces and a slight hypertrophy of the interalveolar connective tissue, which explains their density. On a section they are of grayish-white or reddish-white appearance. Their resolution takes place through fatty metamorphosis of the cellular contents and a shrinkage of the connective tissue, while the capsule remains practically unchanged. This resolution is macroscopically noticeable by a change from the roundish shape to a spindle form. We fail, therefore, to observe any pathological state in these glands which can be regarded as pathognomonic of syphilis.

Quite different from the generalized lymphadenitis in its symptoms and pathology is a form of localized gummatous affection of the ganglia, occurring as a rather unusual manifestation in the later periods of syphilis. This gummatous bubo has been made the subject of an excellent monograph by Lustgarten (Med. Record, 1890, No. 2), to which we refer the reader for further particulars.

SYPHILITIC CACHEXIA.

By syphilitic cachexia is understood the profound alteration of t blood and the resulting chain of general symptoms which are noticeal at different periods during the course of syphilis. Fortunately, with o modern, improved methods for treating the disease we have very rare occasion to observe those historical cases of utter physical deterioratio and whatever we do see of it may with few exceptions be safely p down as the result of insufficient, negligent, improper, or no treatme at all.

From the preceding remarks on the morphological changes of t blood it will be seen that during the latter part of the second period incubation we have a true chloro-anæmia and leucocytosis which is p ductive in most cases of certain characteristic signs of a general cache which were mentioned under the heading Prodromata. A similar c dition of anæmia, though less marked in its systemic effects upon patient, may be observed during the whole period of the syphiloderma particularly in such patients as were already before of a weak, deb tated constitution. Frequent headaches and nocturnal pains in the bo —the so-called osteocopic pains—are significant of this form of cache Although it is usually amenable to proper treatment, we meet occasi ally with those cases of malignant or galloping syphilis in which cachexia becomes so alarming, that even the most painstaking mana ment can hardly prevent fatal results.

In long-protracted and severe cases, those who enjoy only short in vals of latency, but are characterized by frequent relapses, after long-c tinued ulcerative processes on the skin, under the combined influence other constitutional diseases and of serious visceral affections, there res a chronic adynamic condition peculiar to the tertiary or late stage syphilis—*tertiary cachexia*. Tuberculosis, scrofulosis, rickets, hæn rhagic diathesis, alcoholism, are among these constitutional causes. M bid processes in organs whose physiological function is important for general nutrition and the regeneration of the blood, as the liver, sple kidneys, the intestinal tract, the deep lymphatic glands will natur favor such a cachexia. It will be seen from later chapters of this w of what nature these visceral affections are. Their influence upon blood results in a grave form of chloro-anæmia, occasionally even a of pseudoleukæmia. This latter condition is probably in no small deg due to chronic pathological changes in the deep ganglia (lymphatic leu mia), or to affections of the spleen or the bones (myelogenic leukæmia

The general symptoms accompanying this tertiary cachexia are in way typical, but resemble in many respects those observed after ot chronic wasting diseases. The complexion of the patient becomes and leaden; the skin is thin and flabby; his digestion is impaired; all life energy seems to be gone; the sleep is disturbed by osteocopic pains. The patient complains of palpitations of the heart, and vertigo; he is exceedingly nervous. All these symptoms may improve under careful tonic treatment, change of surroundings, and ideal hygiene, unless amyloid degeneration of important visceral organs has gone so far as to exclude the possibility of restoration. According to Fournier, women are more liable to develop these serious forms of cachexia. Besides chloro-anæmia he mentions another form of cachexia in women which he terms "asthænia." In this condition there are no outward signs of anæmia, but the general debility and prostration are very marked and often of an alarming character.

Syphilitic cachexia is particularly characteristic and especially frequent in the hereditary form of syphilis.

We must not overlook the fact that the excessive and injudicious use of mercurial preparations is to no small extent responsible for what frequently appears under the picture of syphilitic cachexia. We have seen above, from the investigations of Konried, that the hæmoglobin suffers greatly from too large mercurial doses, and we can understand what deleterious influences those enormous quantities of mercury must have had, which were the rule of treatment in former times, and even up to our modern times, where more rational methods have been formulated.

TRAUMATISM AND SYPHILIS.

The relations of traumatism to syphilis may be considered from two points of view. On the one side it is of special interest for us to know in what manner the skin and mucous membranes of a syphilitic person react against different irritants—i. e., the influence of traumatism upon syphilis. On the other side, it is of the utmost importance to ascertain whether latent or active syphilis has a modifying effect upon the healing of wounds, particularly in reference to surgical operations—i. e., the influence of syphilis upon traumatism.

It is a matter of daily observation that the most varied and in no way specific irritants are capable of exciting specific lesions on the skin and the mucous membranes of individuals suffering from constitutional syphilis. Cazenave pointed this out some fifty years ago. Ricord emphasized it especially in his lessons on the chancre. Such observations are, however, often made also as regards other well-known skin diseases. We know that, for instance, psoriasis, lichen planus, and many other dermatoses, have a predilection for such regions as are exposed to mechanical irritation and pressure, and that fresh efflorescences appear on places that had been subjected to some irritation, say the scratching of a pin. In a

similar way we can produce artificially wheals in certain forms of urtic
ria ; new patches of eczema follow different local irritants. Kaposi h
expressed it as almost a law governing most skin affections, that the ski
reacts against irritants with a sort of specific energy in the sense of tl
original disease. The study of syphilis offers many occasions for ju
such observations. Papular eruptions on the palms, the so-called psori
sis specifica palmaris, occurs most frequently, and is especially stubborn i
persons who perform hard manual labor, or who mechanically irrita
their palms in rowing or other gymnastic exercises. Excessive smokin
or chewing often causes mucous patches on the lips, the tongue, or fauce
Singers and speakers develop rebellious affections in the throat ar
larynx. The different normal and pathological secretions and excretio
may form the exciting cause for fresh syphilitic eruptions, as the urin
sweat, preputial smegma, gonorrhœal or leucorrhœal discharges. Th
explains the frequent occurrence of condylomata around the anus and
the genito-crural folds. Many other illustrations of this kind could
furnished. It is only recently that more attention is also paid to tl
fact that different nonspecific skin disorders may act as irritating facto
in the above-mentioned way. One of the oldest observations in th
respect was made by Bamberger in 1858. He mentions a transformati
of variola pustules into syphilitic ulcers. Finger (Prag. med. Woche
schr., 1881, No. 40) reports the change of furuncles into specific ulce
and the development of a small papular syphilide out of an eczem
Unna (Monatsh. f. prakt. Derm., 1888) published a very instructive ca
where the localization of a syphilitic eruption was determined by a c
existing seborrhoical eczema ; and Plumert (Archiv f. Derm. und Syphil
1890) adds another illustrative case to this subject.

Cauterisatio Provocatoria.—Especial interest in this question h
been aroused by Tarnowsky's monograph, "Syphilis und Reizung
(Viertelj. f. Derm. und Syph., 1877). Starting from the well-establish
fact that syphilitic manifestations are apt to appear after some traum
tism, he made a series of experiments on two hundred syphilitics a
fifty patients suffering from other affections, in the hope of finding a tr
diagnostic criterion for latent syphilis. He cauterized a small area wi
Ricord's paste (sulphuric acid and powdered charcoal), and found, as
positive result of what he called "cauterisatio provocatoria," a dark-r
infiltrated zone, which becomes distinct only after the inflammatory rea
tion produced by the caustic has vanished. This wall is sharply co
toured, hard, three to five millimetres wide, arises gradually, and assumes
brownish color. After twenty to thirty days it slowly begins to disappea
A distinct induration is also noticeable underneath the eschar. Wh
the crust finally falls off there appears in its place a round or serpigino
ulcer, or a few papules, pustules, or tubercles in the surrounding ski

He emphasizes that such a result may be almost regularly noted in the period of secondary incubation, particularly on patients who had not been subjected to mercurial treatment. In visceral and other forms of tertiary syphilis the result was often negative. Kaposi, Rinecker, and Koebner were unable from their own experiments to verify these statements, while Rieger and Gay fully confirmed them. Although Tarnowsky himself was not able to insist upon the absolute diagnostic value of his cauterization, we may still regard his researches as in many respects interesting and valuable.

In considering the influence of syphilis on traumatic lesions made for surgical purposes, we must not overlook the fact that we live to-day in an era of surgical asepsis and antisepsis and the most vigilant care for the management of wounds, as compared with the utter ignorance of true surgical cleanliness that prevailed before the time of Lister's immortal discoveries. Many statements concerning the disastrous results of operations on syphilitic persons coming to us from those times must therefore at present be taken *cum grano salis.* We still read of an omphalitis following the ligation of the umbilical cord in children suffering from hereditary syphilis, and the transformation of vaccination punctures into syphilitic ulcers, but these occurrences admit of a different explanation. It may be well to point out in this connection that the micro-organism of syphilis—whatever it may be—has *per se* no special tendency to produce suppuration, as is best evidenced in the fact that the chancre, the classical product of syphilis, is hard, and shows rarely any disposition to suppurate. Wherever we see pus in syphilis we have, as a rule, a form of mixed infection. With all due credit to the work of Verneuil, Petit, Duesterhoff, Folinea, and others, who have furnished valuable knowledge as to the influence of traumatism upon syphilis, we can not accept their statements *in toto,* at least not as far as they refer to surgical operations; for it is the united experience of most modern surgeons that traumatic and surgical wounds may heal in syphilitic subjects in the very same manner as in nonsyphilitic ones, as long as the modern recognized principles of wound treatment are strictly adhered to. At the same time we are very well aware of the fact that a severe syphilitic cachexia may interfere with the proper healing of wounds; but here we have to deal not with the specific influence of syphilis as such, but simply with the effect of the general deterioration of the system, which, if due to other nonspecific causes, would work in a similar manner. We also recognize in its full consequences the universally admitted fact that syphilitic lesions, as such, will not stand surgical interference without considerable reaction. The incision into a gumma, into a syphilitic cicatrix, will almost always be followed by ulceration. Neumann (Viertelj. f. Derm. und Syph., 1885, p. 209) has found that, months after the disappearance of syphilitic papules from the skin, there are still present microscopic remains of cell infi tration around the papillary blood-vessels. We can well understand tha a traumatic lesion on such places will easily stimulate these deposits t renewed activity. In this manner we may understand the many failure that are encountered in plastic operations upon syphilitic subjects. Bu a clean cut on a portion of the skin free from any syphilitic deposit, an in a patient otherwise well nourished, will always heal without an trouble.

SYPHILIS OF THE SKIN.—SYPHILODERMA.

BY PRINCE A. MORROW, M. D.

UNDER the general term *syphilides* are comprehended the various alterations in the skin and mucous membranes produced by syphilis. While the syphilitic process may affect every organ and constituent element of the body, its most constant and most characteristic manifestations are determined toward the skin and mucous membranes. The symptomatology of many cases of syphilis, especially of the acquired form, consist chiefly, and in some instances exclusively, of these surface phenomena.

The syphilides are of the utmost importance from a diagnostic point of view, not only in the early stage by furnishing positive evidence, in a visible and palpable form, of the infection of the general system with the syphilitic virus, but their diagnostic significance continues during the entire period of the disease, enabling us to recognize the specific nature of coexistent or succeeding visceral lesions not accessible to ordinary means of investigation. So rarely does syphilis fail to produce lesions of the skin and mucous membranes that their appearance is always looked for as the necessary confirmation of the diagnosis.

In this article only the cutaneous manifestations of the acquired form of syphilis will be considered.

GENERAL SYMPTOMATOLOGY.

The changes in the skin caused by syphilis embrace almost every form of lesion which the structures of this organ are capable of producing—macules, papules, pustules, bullæ, tubercles, and the secondary changes of scaling, crusting, ulceration, and cicatrization are represented in the clinical picture. These eruptive elements are so numerous and varied that there is no single skin disease of constitutional origin which may not be closely imitated. Indeed, it may be affirmed that every form of syphilitic lesion has its prototype among the dermatoses. Hutchinson has formulated it as a general law, that "while syphilis may imitate all known forms of skin disease, it can create no originals."

The morphological resemblance of specific and nonspecific lesions is not surprising in view of the fact that all alike represent the products of inflammation and involve precisely the same anatomical structures. I the case of syphilis the inflammatory process is essentially chronic, th slowness of evolution and the duration of its eruptive phenomena distinguishing them from the ordinary exanthemata. While syphilitic simulation is a marked feature of the earlier efflorescences, it is much mor strongly expressed in the manifold morbid processes to which the late lesions are subject.

Special Characteristics.—Although syphilitic skin diseases consist of the same eruptive elements as are met with in other forms o cutaneous disease, yet they are impressed with certain peculiarities whic reveal more or less distinctly their specific origin and nature. Thes peculiarities relate to their evolutionary mode, multifarious characte color, configuration, grouping, etc., which will be referred to in detai While no single feature is absolutely pathognomonic, yet taken togethe they constitute a clinical picture which is as a rule readily recognizable.

Evolutionary mode. Compared with other inflammatory affection of the skin, syphilitic eruptions develop with remarkable slowness an run a protracted course. They are further characterized by a tendenc to develop in successive crops, which are rarely composed objectively o the same eruptive elements. The chronic aphlegmasic character of th syphilitic process permitting the development of new crops of eruption before the involution of the old ones, the transformation or gradual pa sage of one form into another, the modifications which the same lesio undergoes in the various stages of its development and decline, give t the syphilitic eruption a distinctive physiognomy which is expressed b the term

Polymorphism. The multiplicity of eruptive forms present at th same time constitutes one of the most constant and characteristic featur of the syphilitic eruption. In no nonspecific disease of the skin is th peculiarity developed to the same extent and with the same frequenc Macules, papules, scaling patches, and pustules may be found side by sid or on different parts of the body, and this association or coexistence o elementary lesions of dissimilar forms is the rule in syphilis rather tha the exception.

The symmetry of the syphilitic cutaneous manifestations is a ver characteristic feature during its earlier stages, the lesions on one side o the body forming an exact counterpart of those on the other. This ten ency to symmetrical disposition, which is equally well marked in th exanthemata, and therefore of no especial value as a differential featur becomes less marked as the disease advances in its evolution. The lesion of the tertiary stage, although frequently found on both sides, are rarel symmetrical.

The configuration and grouping of the syphilides are distinctive. Th points of efflorescence manifest a tendency to develop in curved lines, forming circles, arcs, or segments of circles, which is especially seen in the papular syphilide. This peculiar grouping is determined, no doubt, by the anatomical arrangement of the cutaneous capillaries. The tendency to assume an annular form is also manifest in individual lesions of the large papular type and tubercular lesions which advance at the periphery while receding in the center. The crescentic, serpiginous, and horseshoe shapes of the ulcerative lesions constitute a characteristic feature.

Location. The syphilides, like the exanthemata accompanying the eruptive fevers, may be distributed over the whole surface of the body, yet each form of the eruption shows a predilection for certain localities.

The erythematous syphilide is usually found upon the chest, trunk, and flexor surfaces, rarely upon exposed parts; the papular syphilide upon the face, brow, margin of the hairy scalp, back of neck, trunk, and limbs; the squamous variety upon the palmar and plantar surfaces, where there is an absence of sebaceous follicles. The pustular syphilides of the acneform and impetiginous varieties exhibit a preference for the scalp and hairy parts of the face, and other regions of the body where the sebaceous and hair follicles are abundant; the ecthymatous and rupial syphilides affect principally the lower limbs; tubercular lesions are found everywhere. Moist papules choose for their location the natural orifices, the commissure of the lips, the entrance to the nares, the genital and anal folds, etc., wherever the skin is fine and delicate and exposed to moisture and friction. On the other hand, certain regions of the body enjoy a remarkable freedom from the eruptive disturbances due to syphilitic infection. Perhaps the most favored localities in this respect are the dorsal surfaces of the hands, wrists, and feet, and the clavicular and sternal regions, which are singularly exempt from the early eruptions; but this immunity does not extend to the late destructive lesions, which are frequently found in the clavicular region.

The color of the syphilitic eruption has always been regarded as a valuable diagnostic feature. It has been variously described as yellowish-red or dirty brown, and has been compared with the color of raw ham, copper, etc.; it differs with the age of the lesion, the texture of the skin, the complexion of the individual, and other circumstances. In the more acute stage the eruption often presents a clear pink or bright red color, which fades to a brownish-red or coppery tint. In dependent portions of the body, as in the lower extremities, the efflorescence may take on a bluish-red or purplish tint, due to stasis and the transudation of the coloring matter of the blood. As the eruption gradually disappears, it becomes greenish-yellow or grayish, exhibiting the changes in pigmentation that characterize superficial ecchymoses. In the later lesions the characteristic coppery hue of the syphilides is not so pronounced. In the blonde, the syphilitic tint is brighter; in the brunette, the brownish tint predominates; in the cachectic, the color is apt to be livid or bluish-red.

The pigmentation of the skin left by syphilitic lesions is due to th escape of the normal coloring matter of the blood into the Malpighia layer and its subsequent metamorphosis. The same result may follo long-continued congestion of the skin from various morbid condition although the purplish-brown, almost black, pigment stains left by syphilitic ulcerations are characteristic, and possess a certain diagnostic value.

The scales of syphilitic lesions differ from those of nonspecific eruptions. They are thinner, more superficial, less abundant, and less adherent than in cutaneous diseases characterized by analogous formation Their color is usually of a dirty grayish-white, and they lack the glistering, silvery-white appearance of the scales of psoriasis, for example.

The crusts of the pustular and ulcerative varieties of specific lesion are grayish, greenish, brownish, or black in color, and exhibit certai peculiarities in their construction. They are made up of superimpose layers; their surfaces are rough and laminated; they are easily detache and are thicker than the crusts of corresponding nonspecific lesion The crusts of ecthymatous lesions are often surrounded by an ulcerativ ring, and seem to swim upon the purulent font beneath. The conica stratified crusts of rupia, which constantly absorb pus from the suppuration that goes on beneath them, attain large dimensions, and are not me with in any other disease.

Ulcerations. The syphilitic ulcerations assume a reniform or horseshoe shape, which is very characteristic. This is due to the fact that th healing of the ulcer takes place in the center, or along the concave margin, while the ulcerative process advances at the convex border. Th margins of the syphilitic ulcer are usually well defined, its edges perpendicular, its floor grayish or pseudo-membranous, secreting a sanious pu often mixed with blood, and surrounded by a reddish areola, which turn to a dark brown.

The *cicatrices* of syphilis are also characteristic in color, contour, an other objective appearances. They are at first pigmented; later th brownish or violaceous coloration gradually disappears, leaving a clea white tint. The cicatricial membrane may be uniformly smooth or somewhat reticulated. They are surrounded by a dark pigmented areola, whic is exceedingly persistent.

The cicatrices following syphilitic ulcerations are often of importanc from a diagnostic point of view, their form and disposition revealing th extent, depth, and course of the ulcerative process which has swept ove the surface.

The absence of pain and itching. The absence of these subjectiv symptoms in the cutaneous manifestations of syphilis is a distinctiv feature, and constitutes a valuable differential sign; the patient is often unconscious of the existence of an eruption until it is brought to his attention by the physician. The absence of pruritus is probably due to the slow, indolent character of the specific process. This negative characteristic, however, does not always obtain. In certain syphilides marked by a precocious, rapid development, especially those of the pustular and nodular varieties about the scalp and head, and the mucous patches about the genitals, the pruritus is frequently quite pronounced. Syphilitic lesions that are exposed to constant friction and irritation, as at the angles of the mouth, between the toes and about the anus, etc., are sometimes exceedingly painful.

It has been observed that, when syphilis has developed in persons of an eczematous diathesis, the eruptions may be extremely pruriginous.

Regular Evolution.—In the ordinary evolution of syphilis the cutaneous manifestations develop with a certain order or regularity not absolutely constant, but with sufficient uniformity to admit of their division into two more or less distinct classes, designated as secondary and tertiary accidents. In its methodic evolution syphilis presents many points of resemblance with the eruptive fevers, in which a classic period of incubation is succeeded by an eruption of definite anatomical form. In the case of syphilis an incubation period of six or seven weeks intervenes between the appearance of the chancre and the outbreak of the eruptive phenomena. This period may be somewhat abridged, or it may be materially lengthened. Exceptionally it may be prolonged to three, four, or five months, or even longer.

The *secondary* eruptions are generalized, superficially seated, with a tendency to spontaneous disappearance. They are not continuously present, but come out at variable intervals in successive crops, periods of activity alternating with periods of repose, in which no manifestations are observed. Fournier has very properly characterized a syphilis of ordinary severity "as a condition of apparent health, interrupted from time to time by morbid invasions of limited duration."

In the normal evolution of syphilis, if it may be so termed, there is not only a chronological regularity in the appearance of the accidents, but there is also a definite order in the development of the different eruptive forms. The syphilitic process ordinarily affects the skin by the successive implication of one layer after another, with a gradual and progressive extension from the superficial to the deeper structures. According to this pathological programme, macular, papular, and pustular eruptions develop in a certain order of succession, enabling us to draw a distinction between recent and remote eruptions from the tissues involved. There is thus a correspondence between the anatomical characters of the lesion and the date of its development, and one may determine with approximative certainty the age of the syphilis from the objective char acters of the eruptive elements. The stage of secondary manifestation is always of limited duration; after a certain period they cease to appea This cessation of activity may be permanent, marking the definite end o the disease, or it may, after a more or less prolonged period of latenc be succeeded by tertiary accidents.

The cutaneous manifestations of *tertiary* syphilis are characterize by special features sufficiently typical to constitute a separate group they are ranged without symmetry, localized and deep-seated. In th evolution of these accidents all resemblance to the eruptive fevers cease there is no order or sequence in their development. They present th widest variations in number, morbid activity, and the intervals whic separate their outbursts. There is practically no limit to the duration this stage. After years of repose and inactivity the disease may su denly reveal itself by lesions of a profoundly destructive character.

Parallel between Secondary and Tertiary Accidents.—Th more strongly marked and distinctive characteristics of secondary an tertiary eruptions may be thus formulated:

Secondary manifestations almost always follow the primary lesion without their occurrence syphilis can not positively be said to exist Tertiary manifestations are not inevitable; they occur only in a certai proportion of cases.

Secondary eruptions are generalized, symmetrical in developmen superficial in character, with a tendency to spontaneous involution. Te tiary eruptions are limited and localized, asymmetrical, deep-seated, wi a destructive tendency, producing more or less loss of tissue, and leavin permanent cicatrices.

Secondary manifestations appear promptly after a classic period incubation, and in a certain order of succession—erythematous, papula pustular, etc.; they are limited in duration, and after a certain period th cease to develop. Tertiary manifestations develop without order regularity, it may be immediately after the chronological completion the secondary stage, or it may be months or years later; their tendency to persist and spread locally; they may continue to recur during the li time of the individual.

Secondary eruptions yield with remarkable facility to the curative i fluence of mercury, while tertiary symptoms prove refractory to its us The action of iodide of potassium in arresting tertiary processes marked, while it has but little influence over secondary symptoms.

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* In those exceedingly rare cases reported where syphilis has apparently revealed its for the first time—years after the chancre—by lesions of a tertiary order, it is not pr able that the secondary stage was entirely skipped, but rather that its manifestati were so slight as to pass unperceived by the patient.

The secondary lesions contain the poison of syphilis; they are inoculable and contagious. Tertiary lesions are nonvirulent; they are not endowed with contagious activity.

In tracing this outline of the classic course of syphilis and drawing a parallel between its secondary and tertiary accidents, it is to be understood that such generalization applies only to typical cases. Syphilis does not always pursue this methodic evolution with an orderly procession of its phenomena and a regular gradation of its forms. The topochronological classification of the lesions of syphilis is to a certain extent artificial, and lacking in scientific accuracy. There is no absolute and invariable concordance between the anatomical form of the lesion and the date of its development. There may be an overlapping of the stages, entirely obliterating the lines of demarcation between them. Secondary eruptions may continue to recur after the chronological completion of this stage, while lesions of a distinctly tertiary type may develop in the first few months. There may be a transmutation of anatomical forms; the papule which represents the type of the secondary lesions may be merged by almost insensible gradations into the tubercle which constitutes the type of tertiary lesions.

Variations in Type.—Even in cases where syphilis pursues a more or less regular development we find a great variation in the type of the disease, viewed from the standpoint of its surface accidents. These variations relate to the intensity of the eruptive phenomena, their multiplicity and succession, their morbid activity and duration.

Intensity.—There is ordinarily a certain correspondence between the character of the cutaneous accidents and the severity of the disease. Many cases of syphilis are mild throughout their whole course, and this essential benignity is expressed in the cutaneous exanthem, which impresses the skin so lightly as to leave no trace. The entire manifestations may be confined to a macular efflorescence, or a few scattered papules which disappear definitively in the course of a few weeks, and the patient afterward shows no symptoms.

Multiplicity and Succession.—In certain cases the eruption is not only generalized and universal, but there is an almost constant succession of outbreaks; before one group has undergone involution another is in process of development, so that in one form or another the eruption is almost continuously present.

A great diversity is likewise observed in the *character of the morbid process.* In some cases the lesions are dry and atrophic throughout, even the dense, voluminous tertiary deposits undergoing resolution through a degenerative resorption of the cellular infiltration. In other cases the lesions are moist, with a marked tendency to suppuration. The ulcerative process not infrequently takes on the characters of phagedena. In certain cases the tendency to local spreading is a marked feature, the ulcerative process assuming a serpiginous form and creeping over large surfaces.

Duration.—While the earlier accidents of syphilis are essentially resolutive, with a tendency to disappear spontaneously or under the influence of treatment, yet in certain cases the lesions are impressed with a character of chronicity and obstinacy to treatment which is entirely foreign t the nature of the disease. These features are especially observed in certain scaly syphilides of the palms and soles, in leucoderma, as well as i certain superficial glossopathies which persist long beyond the natural life term of such accidents.

Unusual Modes of Evolution.—Under the general category o *irregular syphilis* may be included different types of the disease determined by anomalous modes of evolution. Deviation from the typica evolution of syphilis impresses certain peculiarities upon the eruptiv phenomena and introduces an element of confusion in all attempts t classify them. In these anomalous cases the harmony ordinarily observe between the form of the lesion and the date of its appearance is destroyed and there is instead an intermingling or blending of secondary and tertiary accidents, developed without order or regular sequence.

The irregular development or coexistence of superficial and deep eruptive accidents may be seen in the following conditions:

Benign Rapid Syphilis.—In this class of cases the succession of th eruptive phenomena is so rapid that tubercles and gummata make thei appearance before the complete involution of the papular or pustula eruptions, or there may be a simultaneous development of secondary an tertiary forms. The lesions are, however, essentially benign throughou the entire course of the disease.

Malignant Precocious Syphilis.—In cases of this type there is no only a precocious development of tertiary lesions, but they are characterized by a special gravity. Superficial accidents, if they occur at al rapidly give way to pustulo-ulcerous or gummatous lesions. The syphilitic process seems to skip over the superficial structures and attack a once the deep tissues. Independent of the precocity of the process, th elements of malignity are found in the violence of the irruption, the multiplicity of the lesions, their ulcerative and rapidly destructive characte and their frequently grave systemic complications.

Retrogressive Syphilis.—In this category are to be placed a class c cases in which there is a reversal of the topochronological order c specific manifestations—in which lesions of a distinctly tertiary characte are succeeded by superficial forms of accidents. Thus, for example, resolutive papular eruption may follow a pustulo-ulcerous syphilide whic has left indelible traces.

Cases of this character are so exceedingly rare that they are only mentioned for the sake of completeness. Their occurrence is in direct contravention of a well-established law of syphilitic evolution, viz., that when deep destructive lesions once develop, either in regular order or precociously, they continue thereafter to dominate the pathological field; the syphilitic process does not retrocede and again attack the superficial structures.

Second Infection.—Finally, may be mentioned the very rare but nevertheless well-authenticated cases of syphilitic reinfection, in which the patient may exhibit the characteristic lesions of a second attack while he bears upon his person the stigmata or, it may be, the active manifestations of a former attack.

In some of these cases the first attack produces peculiar modifications in the general character and course of the second one; in other cases, however, the course of the disease conforms in all respects to its classic mode of evolution in a virgin case.

Etiological Considerations.—The cause of the immense diversity in the cutaneous expressions of syphilis must be sought for not in the quality or the source of the syphilitic virus, but in the character of the soil in which it is implanted. While we recognize that the presence of the syphilitic virus in the economy is the efficient cause of its eruptive phenomena, we must also recognize that behind and beneath this essential etiological factor there are certain causes inherent in the organism which markedly modify their general characters and course.

Constitutional Peculiarities.—The more we study syphilis the more we are impressed with the fact that the type or quality of the disease is largely the product of peculiarities of individual constitution. These peculiarities may be quite independent of physical endowments which have a relation to the general health of the individual. While syphilis is usually more severe in the cachectic, the weak, and the debilitated, yet severe eruptive disturbances may occur in robust persons who are otherwise in vigorous health. On the other hand, delicate persons often suffer lightly from syphilis.

The most important factor in determining the character of the cutaneous manifestations of syphilis is the *idiosyncrasy* of the patient; no other explanation of the manifold and marked differences in the eruptions which attend syphilis can be given. The essential nature of this etiological factor can not be defined. As far as we can apprehend its causal relation to the cutaneous phenomena of syphilis, it would seem to consist in a greater or less susceptibility of the cutaneous tissues to the irritant action of the syphilitic virus, and in certain localizing influences due to inherent peculiarities of structure, which determine the type of the morbid process.

Independent of this individual predisposition there are also numerou accidental conditions of a general or local nature, and various pathologic circumstances which influence the mode of syphilitic evolution. The occasional causes may favor the appearance of the cutaneous phenomen multiply or aggravate them, determine their localization in certain region hasten their disappearance, and in other ways derange their normal ev lution.

Climate.—The extensive geographical distribution of syphilis h afforded an abundant opportunity of studying the influence of climat conditions. In general it may be said that syphilis is more apt to be medium intensity in temperate regions, and that the cutaneous manifest tions are severer in hot climates. The aggravating influence of climate relative rather than absolute; it would seem to depend upon conditions adaptation of the individual. It has been observed that while syphilis not ordinarily more severe in the natives of hot countries, it is apt to d play features of malignity in foreigners who have not been acclimat The influence of cold and humidity upon the intensity and duration syphilitic eruptions is well attested. It has been observed that syphilit whose industrial occupations expose them to these unfavorable conditi are apt to have aggravated and persistent eruptions which are exceedin obstinate to treatment.

Age and sex seem in no way to exert a decisive influence upon general characters of the syphilides. While syphilis is more apt to severe in the extremes of life, when the capacity of resistance is the le yet this increased severity is reflected rather upon the nervous and nu tive systems than upon the cutaneous surface. It has been observed t in women and children the cutaneous accidents are more apt to be lo ized around the natural orifices, and there is a greater tendency to tra formation into mucous patches, which may be explained by the grea fineness and delicacy of the skin.

The influence of physiological crises is more or less marked. manifestations of hereditary syphilis, even when the diathesis has b long dormant, are apt to reappear during the periods of second dentit and of puberty. The influence of pregnancy, lactation, and the me pause in exciting, aggravating, and prolonging the duration of syphi accidents is a matter of common observation.

Alcoholism.—Observation shows that syphilis is more severe in intemperate. The stimulating effect of alcohol upon the nervous cutaneous vascular systems explains its undoubted influence in deter ing successive or more or less continuous crops of accidents. A longed debauch will provoke the appearance of an eruption in a l latent diathesis.

In connection with the pathogenetic influence of cutaneous excitat *ab ingestis*, may be instanced the internal use of *sulphur waters.* It is well established that sulphur waters have a marked influence in provoking an outbreak of new crops, or of aggravating an existing eruption in syphilitics. The *action revelatrice* of sulphur waters has been long and extensively utilized by physicians and patients as a touchstone of the activity of the diathesis.

Certain *drugs* which exercise an irritant action upon the cutaneous vascular system influence the outbreak of syphilitic phenomena.

Diathesis.—The marked influence of certain diathetic conditions upon the general characters and course of the syphilides is worthy of consideration. There is no necessary incompatibility between syphilitic skin diseases and other eruptions of a nonspecific nature. Syphilis does not so completely dominate the pathological field as to exclude other maladies. It is a matter of common observation that syphilis is not only more severe in eczematous, scrofulous, and lymphatic subjects, but that it manifests the same topographical affinities and imitates the general characters of the diathetic disorder.

The predisposition to eruptive disorder constituted by the *eczematous diathesis* not only hastens the explosion of accidents, but aggravates and prolongs them. In such individuals syphilis has a tendency to localize itself upon points which are seats of predilection for eczema, and such lesions not infrequently undergo what has been termed a dartrous metamorphosis. As examples, may be mentioned syphilides of the palms and soles, which take on the objective characters of eczema and prove exceedingly rebellious to specific treatment.

The reactionary effect of *seborrhœa* upon syphilis is well known. Unna has called attention to the fact that syphilis developing in a seborrhœic individual exhibits in form, localization, grouping, and scaling so many features of resemblance to seborrhœa that it can be explained only on the assumption of a pathological relation which he terms an "interlocking" of the two processes, giving to the syphilis a seborrhœic physiognomy. According to him, "the flat, inflammatory, reddish-yellow seborrhœic plaques become transformed into pigmented, more elevated, hard, specific papules, varying in coloration from that of flesh to that of copper, in infiltrations papular at the borders, circinate, raised, which betray their origin by their thick, easily detached crusts and the yellowish tint of the neighboring parts. Upon the hairy scalp, the beard, and the pubes these incrusted papules unite here and there, forming prominent plaques, depressed at the center, and surrounded by perpendicular, polycyclic borders. . . . Syphilis follows the lines of the gross sudoriparous glands, inflamed and affected with 'seborrhœa in the naso-labial furrow. This condition is so typical that it is easy to recognize at a glance, when one has to do with a seborrhœo-syphilitic affection."

The coincidence of the *scrofulous diathesis* determines marked mod fications in the character of syphilitic manifestations—in their forn localization, and processes. Syphilitic lesions in such subjects are apt t be moist, with a marked tendency to suppuration and ulceration. Tl objective identity of the scrofulodermata and the syphilodermata h indeed suggested a combination or symbiosis of the two morbid pr cesses, constituting what has been termed scrofulo-syphilis. It is excee ingly difficult to differentiate between them and assign to each diathet disorder the precise measure of its pathogenetic influence.

Intercurrent Maladies.—Any intercurrent inflammatory process in tl course of syphilis may, by creating a flexion to the surface, determine explosion of cutaneous accidents. An intermittent or other acute febri attack may materially shorten the duration of the secondary incubati and precipitate the appearance of the syphilitic exanthem. Mauri reports a case in which an attack of rubeola abridged the duration this period to twenty-seven days, when constitutional accidents appeare Such pathological coincidences frequently affect the form and locali tion of the eruption, and may hasten its involution. Unna states that miliaria rubra may bring about the outbreak of a small papular syphi derm; an attack of scabies may cause a preference for the interdigi folds and gluteal prominences as places of predilection for the exanthen

As is well known, an attack of variola may cause the rapid involuti of a specific exanthem; but it is to be noted that not infrequently pustules of variola become gradually transformed into mucous patch tubercles, or other characteristic specific lesions.

An attack of typhoid fever, pneumonia, pleurisy, etc., may cause rapid involution of existing specific accidents. This curative effect however, of transitory duration; the cutaneous manifestations are tined to reappear in full force when the repressive influence of the feb access is removed. I have observed a papulo-squamous syphilide extensive distribution rapidly melt away during an attack of dou pneumonia only to reappear when the stage of convalescence was fu established. That an attack of erysipelas exerts a salutary influence u various lesions of the skin is a rule to which syphilitic manifestati form no exception. Its effect is not limited to the surfaces invaded the erysipelas, but is manifest in regions remote from the local inflam tory focus. The curative action of erysipelas, as of other infecti fevers, is not durable; it constitutes only a temporary interruption in course of the disease.

Local Causes.—The principle that a latent syphilis may be called activity by an external irritant is well known, and its application has utilized as a test in the *cauterisatio provocatoria*. Traumatisms, ve tories, or other cutaneous irritants not infrequently provoke a syphi eruption upon and about the seat of the irritation, or intensify the characters of an existing eruption. The localizing effect of vaccination in determining a papular efflorescence which is massed about the vaccine vesicle has been often observed. Wounds upon syphilitic persons may assume the characters of syphilitic ulcers. It is not uncommon to observe that the local congestions in the lower extremities caused by varicose veins may determine the production of ulcers in syphilitics which manifest an utter insensibility to specific treatment. In these cases no doubt the stagnant circulation creates a *locus minoris resistentiæ*, rendering the tissues more vulnerable to syphilitic action.

The series of *secondary changes* which syphilitic lesions undergo—the greater or less abundance of the secretion, the character of the scales, crusts, ulceration, and resulting cicatrices—while determined largely by the nature of the syphilitic process, are modified in a marked degree by conditions relating to the individual. The atypical forms assumed by syphilitic lesions from peculiar modes of extension are doubtless due to certain local inflammatory and septic processes which are more or less accidental. These modifications mask the specific physiognomy, and create the most deceptive resemblances to other skin diseases which have already been referred to as *syphilitic imitation*.

As examples of the influence of *structural peculiarities of the individual*, may be mentioned the tendency to abundant and excessive proliferation of the epidermal elements which imparts to many cases of syphilis the aspect of psoriasis. This resemblance is marked, not only in the generalized papulo-squamous syphilide, but also in the later scaly syphilides which are localized upon the palms and soles.

The tubercular syphilide often closely imitates the lupoid process. This is especially seen upon the face when the concentric tubercular rings enlarge at the periphery and heal in the center, or again when it assumes a serpiginous mode of extension. In other cases there is a pronounced tendency to hypertrophy of the papillæ, the papillary prominences resembling those of lupus papillaris or verrucosus. In certain cases the vegetations may resemble those of frambœsia. The ulcerations which follow tuberculo-gummous lesions may simulate, in their objective characters and extension, rodent ulcer, epithelioma, etc.

The complications in the course of specific lesions from inflammatory processes, which may be simple, gangrenous, or phagedenic, determine deviations from the type form and singularly diversify the clinical picture of syphilis.

The importance of the *rôle* which *pyogenous microbes* play in the production of the pustular and ulcerative lesions of syphilis can not, in the present state of our knowledge, be clearly defined. Many modern writers are disposed to regard all lesions in which the purulent element is accentuated as local infections due to the accidental access of the microbe of common inflammation. According to this view, ecthyma, rupia, serpiginous ulcerations, etc., are not specific products, but secondary infections ingrafted upon syphilitic neoplasms.

Certainly we find that lesions of a pustular or ulcerative characte are much more common in persons whose hygienic surroundings ar bad, and who have been exposed to the microbe-breeding conditions o dirt and uncleanliness, and other favoring opportunities which woul render such infection probable. On the other hand, the fact must not b lost sight of that in certain individuals all irritative lesions of the skin exhibit a marked tendency to the production of pus. This pyogenic proclivity may be an individual peculiarity, and entirely independent o external conditions which favor microbic infection. As regards the serpiginous forms of ulceration commonly met with in the later stages o syphilis, it is probable that they are the product of a mixed infection, th primary pathogenetic agent being the syphilitic virus, while the pyogenous process is engendered secondarily by the staphylococci of suppuration. New studies in microbiology are necessary before we can determine, positively, the predominance of the syphilitic or the pyogenic element in the production of these anomalous forms which do not follo the normal plan of syphilitic evolution.

It would appear, therefore, that it is not the number and variety o the elementary lesions which give to this disease its protean physiognomy it is rather the ulterior changes which these lesions undergo that make u the wonderful and bewildering diversity of syphilis. The peculiar type assumed by the morbid process partake more or less of the characters o accidental phenomena; they are not the direct expression of the syphiliti virus, but rather incidental effects resulting from the reactive forces o the organism; they belong to the individual rather than to the disease.

Causes of Tertiarism.—By many modern authorities what has bee termed "tertiarism" is not regarded as the exclusive product of the syphilitic virus, but due to a complex of co-operative causes. This opinio is based upon the comparative infrequency of tertiary manifestations an their nonvirulence. The study of the natural history of syphilis show that tertiary accidents are not inevitable; they occur in but a small proportion of all cases, while inoculation experiments as well as clinical observations have demonstrated the absence of the virulent principle fro the blood as well as the lesion of syphilis which has passed into the tertiary stage.

As regards the *frequency* of tertiary accidents, the character of th treatment, the constitutional peculiarities of the patient, and other conditions, exert a modifying influence. Mauriac, who has made an exhaustive study of this subject, basing his conclusions upon the analysis of ex tensive statistics, puts the proportion of cases that pass into the tertiary stage at from five to fifteen per cent. Haslund, in a communication to the "Tenth International Congress of Medical Sciences," presented statistics of the Communal Hospital of Copenhagen for eight years, embracing 5,636 cases of syphilis, of whom 616, or 10·9 per cent, were affected with tertiary syphilis. Neumann, in a paper read before the "Second Congress of Dermatology and Syphilography," gave an analysis of 9,742 cases of syphilis treated at his clinic; of these, 665, or 6·82 per cent, were cases of tertiary syphilis. As more particularly bearing upon this inquiry, it is to be noted that in less than one half of these cases were the lesions located in the skin. While by most syphilographers cutaneous lesions are considered the most common and habitual expression of tertiary syphilis, Fournier's personal statistics of 3,429 cases of tertiary syphilis embraced only 787 cases of cutaneous syphilides.

The *nonvirulence* of late tertiary products has been generally recognized as a law of syphilis, the exceptions to which are so few that they do not invalidate the rule. At what precise period in its evolution the syphilitic diathesis undergoes that radical transformation which extinguishes its virulent principle can not be definitely stated. The contagiosity of tertiary lesions developed precociously, in cases where there is a precipitation of syphilitic evolution, is still undetermined, as data of definite value are lacking upon which to base a positive opinion.

These facts, taken in connection with the clinical behavior of tertiary syphilis has led many modern syphilographers to class all late accidents as *post- or parasyphilitic manifestations.* Various theories have been advanced as to their pathogenesis; their tendency to localize themselves in certain places, or recur upon the site of previous eruptions, has led to the doctrine that tertiary syphilis is a disease of the tissues rather than of the blood. According to this theory, tertiary manifestations are purely local processes depending upon pathological modifications of the tissues in the secondary stage.

Neumann believes that tertiary syphilis represents isolated foci, which are the *reliquats* of exudates proceeding from the secondary period, and that in addition there are chemical alterations in the tissues which ought to be referred to a specific process, to the secretions produced by the bacteria.

The important pathogenic *rôle* of the toxines or waste products of the bacilli in the production of tertiary accidents, although it rests upon hypothesis and can not in the present state of our knowledge be clearly defined, is nevertheless generally conceded.

Whatever differences of opinion there may be as to the immediate and efficient cause of tertiarism in syphilis, all observers agree that there are certain accessory or contributing causes which exert a marked influence in predisposing to these accidents. Prominent among these etiological factors are the absence or insufficiency of treatment, the coincidence of certain pathological states, as scrofula, tuberculosis, malaria, alcoholism, privation, misery, etc.; in fact, all those conditions which are recognized as factors of gravity in syphilis tend to perpetuate the disease in the form of tertiary manifestations.

While the lack of treatment and the pathological predispositions constituted by the conditions just enumerated undoubtedly play a prominent *rôle* in the production of tertiarism, yet in a large proportion of cases they may be eliminated from consideration. Long-continued observation shows conclusively that the most active and prolonged treatment does not afford an absolute guarantee against the occurrence of tertiary accidents; on the other hand, many syphilitics who have never taken a grain of mercury or iodide of potassium entirely escape them. Likewise, persons in the most flourishing health, entirely free from any diathetic predisposition, and exposed to no unfavorable hygienic conditions, may develop a severe type of tertiary syphilis, while the subjects of the most profound cachexias may never pass into the tertiary stage. These clinical facts force us to recognize that the most powerful predisposing cause of tertiarism must be sought for in physiological peculiarities of individual constitution. This physiological predisposition is expressed in a peculiarity of the organic substance, by virtue of which there is a greater aptitude to conceive the action of the syphilitic poison and to develop and perpetuate its morbid processes almost indefinitely. In cases where it does not exist the normal reactionary forces of the organism, aided by treatment, are sufficient to dominate the disease and limit its manifestations to the secondary stage.

Since the definite peculiarities of organization which constitute individual predisposition are revealed by no outward sign, they escape recognition and can not be utilized for prognostic purposes. Any opinion as to the eventuality of tertiary accidents must therefore in ordinary cases be based largely upon a calculation of probabilities. As Mauriac states: "*C'est une affaire de chance;* it is probable that such or such a patient will escape tertiarism because it is relatively infrequent in proportion to the aggregate of cases of syphilis that turn out well."

General Morbid Anatomy.—It will simplify our conception of syphilis to recognize that its numerous lesions, no matter how diverse they may appear, all possess essentially the same histological characters, and owe their origin to the same pathological process. Microscopical investigation shows that every form of syphilitic lesion, from the earliest and most superficial to the latest and most profound, consist of an infiltration of round or embryonic cells in the connective tissues of the different organs. These embryonic cells constitute the essential element of every syphilitic lesion. Even in the erythematous eruption which expresses the lightest and most transitory touch of syphilis there is, in addition to the hyperæmia, a slight cell infiltration permeating and surrounding the walls of the blood-vessels of the papillæ and corium. In the syphilitic papule, which represents the type and generating element of all other lesions, the process affects primarily the papillary body; later, by an extension of the process to the deeper parts of the derma and the subcutaneous tissues, the tubercle or gumma is evolved. Accordingly, then, as the cellular proliferation affects this or that constituent element of the skin, we have differences in the situation, volume, density, and conformation of the lesions, but they are all united by the lines of histological identity.

It is a pathological law which admits of no exception, that these infiltrated cells never become organized into connective tissue, but undergo involution through absorption, or disappear by a process of suppuration.

A special feature of syphilitic infiltration is its tendency to increase by peripheral extension, so that the borders always represent the most recent cell accumulation. This centrifugal tendency is equally marked in the retrogressive process which invariably begins in the center or oldest part of the infiltration. The three fundamental characters of all syphilitic lesions—infiltration, nonviability, and centrifugal course—have been clearly formulated by Jullien as follows:

"I. *Infiltration of the derma and of the mucous layer of the epidermis with small cells.* These cells, which closely resemble the aspect of the embryonic elements encountered in fleshy granulations, are heaped up at the periphery of the vessels, between the trabeculæ of the corium, and finally involve the papillæ and Malpighian body to such a degree that the limitation between these two layers of the skin entirely disappears.

"II. *The inevitable destruction of those cells which are incapable of organization.* At the end of a certain time the infiltrate undergoes a fatty degeneration and enters in the organism by resorption or ends in a purulent dissolution. In any case the vitality of the secondary syphiloma is not sufficient to transform it into definite tissue. After its disappearance the elements of the tissues in the midst of which it was established again take on their normal disposition without any necessary loss of substance.

"III. *The centrifugal course of the neoplasm, both in its development and in its retrogression.* It is always from the center to the periphery that the infiltration takes place; the borders of the lesion are consequently more recent than the center; hence the differences in aspect which may be presented in the two parts. When the center becomes depressed under the influence of retrogression, the neoplasm may attain its maximum of development at the borders ; such is the reason of certain forms—cup-shaped, annular, etc."

The clinical signs presented by the papule in its evolution, and the ulterior alterations which it undergoes, admit, therefore, of an easy interpretation. "The papule is prominent because there is a cellular infiltration ; hard, because this infiltration is dense ; it is brilliant, because the epidermis is tense over the summit ; surrounded by a collarette, because the horny layer breaks under the effect of this tension ; it is red, because the coloring matter of the blood furnishes an extravasation ; and, finally, when resorption takes place, the epidermis wrinkles at its surface and is eliminated by an ephemeral desquamation."

Modifications of the papular type occur from the punctiform or more diffuse character of the cell infiltration, its localization in or about the follicular structures, etc. A slight increase in the intensity of the process produces an exudation of serum, which raises the epidermis, resulting in a vesico-papule or a papulo-pustule. Exceptionally the entire exudate may become purulent, presenting the characters of a frank pustule.

The tubercle, which may be regarded as an exaggerated papule differentiated by its deeper infiltration, its denser consistence and more globular form, and the gumma represented by a mass of embryonic cells in the subcutaneous tissue forming a nodule, both increase gradually at the periphery, while the central cells undergo necrobiotic changes. All the different phases exhibited by both tubercle and gumma in their developmen and decline may be referred to peripheral hyperplasia and central mortification.

Diagnosis.—The elements of diagnosis are based chiefly upon the semeiological characters which have already been traced—polymorphism symmetry, color, configuration and grouping, location, absence of subjective sensations, etc. These undoubtedly constitute valuable diagnostic signs, which enable one oftentimes to pronounce at the first glance and without hesitation upon their specific nature. Nevertheless, it is well to bear in mind that the specificity of syphilitic lesions does not rest solely upon their morphological characters. There is no single characteristi attributed to syphilitic skin diseases which belongs exclusively to them each and every feature may be manifest in the idiopathic affections of the skin. Many forms of dermatitis, such, for example, as eczema and scabies, are characterized by polymorphism and symmetrical development ; the annular configuration is quite as marked in psoriasis ; the grouped disposition is seen in lichen scrofulosus and lichen ruber. Coppery coloration is not confined to syphilis ; many dermatoses manifest the same topographical affinities around the natural orifices and other place of predilection of syphilis.

While there is no single objective phenomenon of syphilis absolutel pathognomonic, yet there are certain peculiarities in the combination, grouping, and mode of evolution of syphilitic skin diseases which impress upon them the "specific" seal. These more minute peculiarities, which serve as a basis of differentiation, will be referred to in detail in connection with the description of the different eruptive forms.

The history of the primary sore, which may, however, be fallacious from its possible confusion with chancroid, or defective, particularly in the case of women, is valuable as presumptive evidence. Of much more value is the general history of constitutional syphilis, and especially the coincidences of lesions manifestly syphilitic upon the mucous membranes or in other organs. This corroborative evidence may be decisive in determining the diagnosis of cutaneous lesions otherwise obscure and equivocal.

Independent of their objective characters, the most precious resource in the diagnosis of the syphilodermata is specific treatment. While resolution is the habitual termination of secondary accidents, yet mercury abates their intensity, and causes a much more speedy disappearance than would have taken place in the natural course of the disease. It is, however, in lesions of the tertiary type that the diagnostic value of test treatment is most signally shown. Many of the late accidents which simulate lupoid, epitheliomatous, and other nonspecific lesions so accurately as to defy differentiation from their objective characters alone, rapidly clear up under the influence of iodide of potassium.

Prognosis.—We have seen that the secondary lesions are essentially resolutive; they are limited in duration, and often disappear spontaneously. While the later lesions do not manifest this tendency to spontaneous resorption, their marked susceptibility to the curative action of specific treatment almost invariably insures their prompt disappearance. Viewed in the aspect of local lesions, the prognosis of the syphilodermata is, therefore, almost always favorable.

The most important question in this connection is the prognostic significance of the eruption upon the general character and course of the disease. It may be asked whether the initial characters of constitutional syphilis, as expressed in the early eruptive accidents, foreshadow the character of succeeding crops. In general it may be said that when the erythematous exanthem appears after the classic period of secondary incubation, disappears, and is followed by a papular eruption in chronological order, this same uniformity will be maintained throughout the secondary period; but this regularity of development does not necessarily extend to the ulterior evolution of the malady. The benignity of secondary accidents does not afford an absolute guarantee against the malignancy of tertiary lesions. Clinical experience furnishes innumerable examples where a secondary syphilis of mild or medium intensity becomes later transformed into a formidable disease with profoundly destructive lesions.

3. Pustular form	Varicella-form or variola-form, Acne-form, Impetigo-form, Ecthyma-form, Rupial.
4. Tubercular form	Tubercular, Gummatous.

A fifth division may be advanced to include certain comparatively rare manifestations which relate to anomalies in pigmentation and hæmorrhagic effusions. Thus:

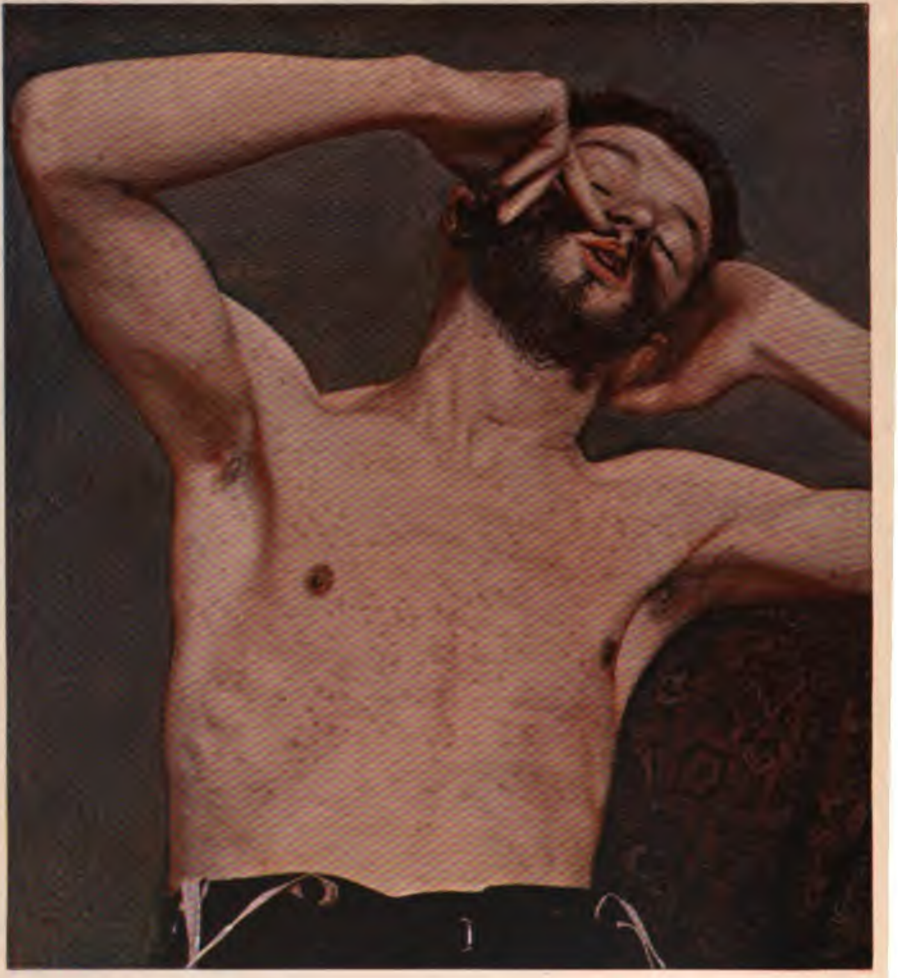
5. Extravasation of pigment	Pigmentary syphilide,
“ blood	Purpuric “

It will be observed that the vesicular or bullous syphilide, which has been by most writers elevated to the dignity of a separate class, is omitted from this classification. Vesicles sometimes form on erythemato-papular lesions from the intensity of the inflammatory process, but their presence is an accidental or accessory phenomenon of exceedingly limited duration. Neither can the bullous syphilide be considered a distinct type, since lesions which begin as bullæ rapidly undergo a purulent transformation. The pemphigoid syphilide is an exceedingly rare manifestation of acquired syphilis; it is almost exclusively found in the hereditary form.

While the erythematous, the papular, the pustular, and the tubercular forms represent the four fundamental types of syphilitic lesions, the combination or blending together of elementary forms has led to the necessity of using compound names, as erythemato-papular, papulo-pustular, papulo-tubercular, pustulo-crustaceous, tuberculo-ulcerous, gummato-ulcerous, etc., in order to more exactly define their anatomical characters. The objective characters of these subvarieties will be noted in the description of the principal types to which they belong. Any system of classification would be indefinitely extended and confused by making separate divisions of the numerous clinical varieties which result from the fusion of the different elementary forms, the transition from one form to another, and the morphological modifications which the same lesion undergoes from the structural peculiarities of the part upon which it is situated.

The terms employed by many writers, such as syphilitic herpes, syphilitic eczema, syphilitic psoriasis, syphilitic lupus, should be discarded from the nomenclature of syphilis, since they lead to a confusion between specific lesions and the idiopathic affections of the skin which they may resemble.

PLATE II.



Chancre of the Lip, with Macular Syphilide.

THE ERYTHEMATOUS SYPHILIDE.

The erythematous syphilide, variously known as the macular syphilide, roseola syphilitica, erythema syphiliticum, etc., is the earliest, the most benign, and one of the most common of the cutaneous manifestations of syphilis.

It is important as constituting the first visible manifestation of a general contamination of the system, and in cases where the primary symptoms are doubtful its appearance furnishes the necessary confirmation of the diagnosis. It probably occurs in nearly all cases, but from the absence of subjective sensations and the peculiarity of its localization upon parts which are habitually covered by the clothing it may entirely escape observation. It may happen, also, that when there is a simultaneous development of roseola with a papular or pustular eruption, the faint objective characters of the former may be obscured or entirely lost in the more prominent lesions with which they are mingled.

The outbreak of the erythematous syphilis is usually preceded by the slight constitutional disturbance known as syphilitic fever. It sometimes develops suddenly, its appearance being hastened by an indulgence in alcoholic excess, by a hot bath, by mental worry, by severe physical exercise, or by any cause of cutaneous congestion.

The date of its manifestation is usually about the forty-fifth day after the appearance of the initial lesion, seldom later, although relapses not infrequently occur. In Plate II is represented an erythematous syphilide which appeared about forty days after the chancre of the lip, which is still unhealed. Its development may be retarded, or even suppressed, by specific treatment.

Two principal varieties of the erythematous syphilide are generally recognized, the macular and the maculo-papular. The marked resemblance which syphilitic roseola not infrequently presents to rubeola in the objective characters of the lesions has led many writers to class this variety under a separate division, as *roséole rubéolique.* In exceptional cases the eruption may assume the aspect of scarlatina, and has led to its designation as *érythème scarlatiniforme.* The shades of distinction between the different varieties of syphilitic roseola are not sufficiently pronounced to justify these subdivisions.

Macular Syphilide.—The macular eruption, which is the one more commonly observed, appears in the form of rounded or oval hyperæmic spots, with ill-defined or irregular borders, and raised very slightly or not at all above the level of the surrounding skin. They are from one eighth to one third of an inch in diameter, varying from the size of a small pea to that of a lentil, or finger-tip, or even larger. Their color is a bright pink-rose red, and disappears on pressure; later, they assume a bluish or ecchymotic color, which changes to a yellowish tint on pressure, and ca not be entirely effaced. On disappearing, they leave a brownish-gray marl more or less persistent. They are seldom attended with desquamation.

The spots vary in number, dimensions, and degree of coloration. I some cases they are few and scattered, while in others they are thickl disseminated, sometimes covering the entire body. They may be so pal as to be hardly perceptible, giving the skin a faintly marbled aspect, c they may be clearly defined and easily visible. A low temperature c sudden chilling of the body brings them out more brightly and vividl in contrast with the surrounding paler skin.

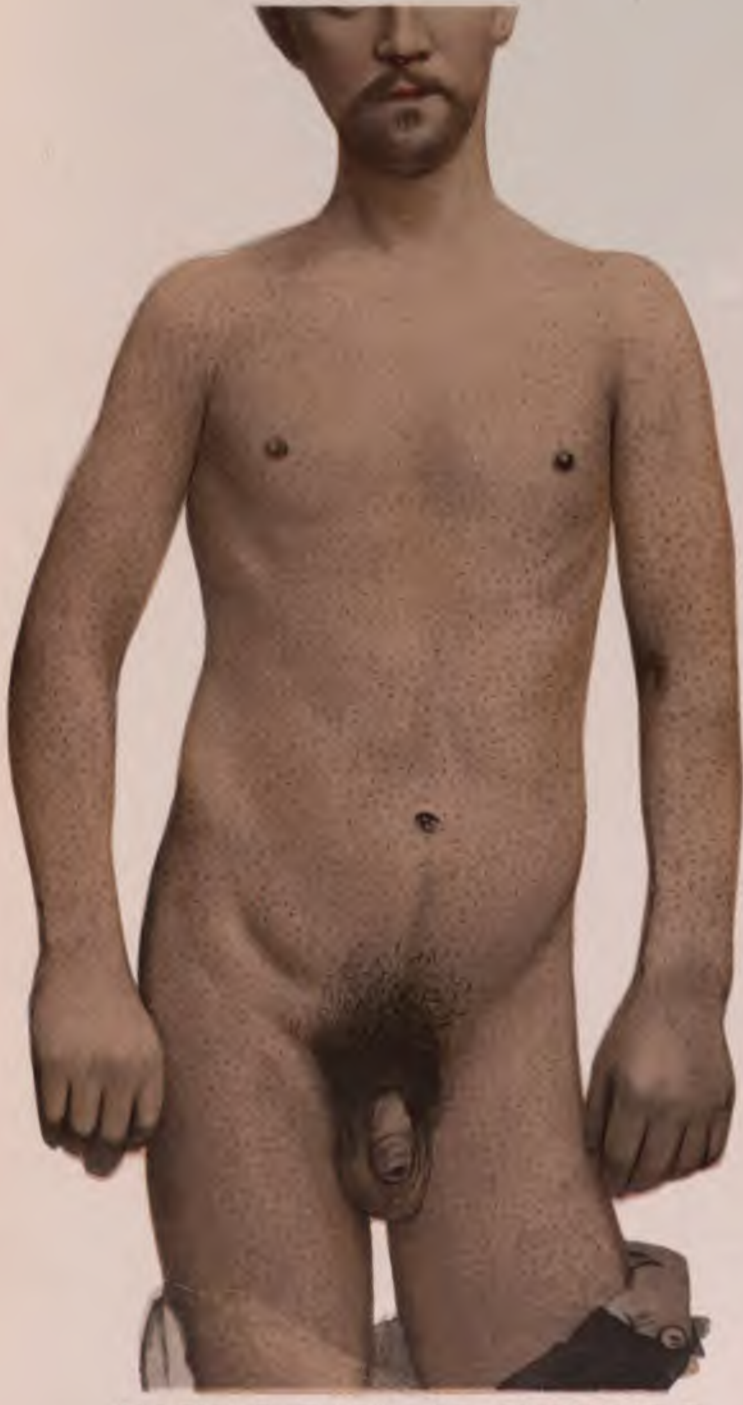
The eruption appears most abundantly upon the chest and abdome the upper portion of the extremities, and the neck; it is more pr nounced upon the flexor than upon the extensor aspect. The face an the dorsal surfaces of the hands and feet are usually spared, although i rare instances it begins upon the face; not infrequently it is confined e clusively to the trunk. It is upon the anterior inferior portion of th chest and over the epigastrium that the first evidence of the eruptio should be sought for. Occasionally, however, the erythematous syphilid has a more general distribution. In a case of the maculo-papular variet represented in Plate III, it is universal, involving the face, back of th hands, and practically the entire surface of the body. Its duration vari from a few days to several weeks. By specific treatment its disappearance is oftentimes hastened, or it may gradually merge from the macula into the papular form.

The Maculo-Papular Syphilide is only an exaggerated or advance development of the macular variety. Its position is intermediate betwee the macule and the papule, and represents a transition of the one int the other. The eruptive spots are slightly elevated, seated upon an erythematous base, and sometimes covered with fine, desquamating scales.

The papular eminences are small, and variously disposed over th erythematous spot. Occasionally one or more larger papules make thei appearance in the center of the erythematous patch. In one variety which has been designated as the *roséole miliaire*, the mouths of th hair-follicles are chiefly affected, giving a certain projection to the lesion resembling the miliary papular syphilide.

The papular lesions have a tendency to assume an annular arrangement, forming circles or segments of circles, and this, together with it symmetrical distribution, is quite characteristic. After its complete involution syphilitic roseola may recur a number of times. The first relaps usually occurs shortly after the primary eruption disappears, although i may come on at any time during the first or even the second year of th disease. With each recurrence the spots are larger, fewer in number, an paler in appearance.

PLATE III.



MACULO-PAPULAR SYPHILIDE.

Although syphilitic roseola is essentially a precocious lesion, it may exceptionally appear as a late manifestation, coinciding with tertiary accidents. Under the designation of *roséole tardive* has been described an eruption which occurs from after the first to the third year of syphilis in the form of rounded, elliptical, or semiannular brownish-red spots, which may be the size of a silver quarter or larger. The lesions are quite superficial, non-elevated, desquamating at the periphery, and always manifest a tendency to clear in the center. Fournier has described a case presenting rounded, oval, brownish, pigmented patches, slightly pityriasic, with clear centers, five years after infection. These late erythematous lesions are little influenced by specific treatment.

The simultaneous development of the erythematous efflorescence with other eruptive forms has been referred to as an occasional phenomenon. There is, however, a coincidence which is of very constant occurrence, and possesses some semeiological importance. In perhaps the larger proportion of cases there will be found upon the hairy regions, more especially the scalp, where syphilitic erythema never occurs, an eruption of small grayish crusts or scabs. These lesions are discrete, and made up of sebaceous secretions. They are easily detached by the comb or the fingers, and as a result of the irritation a purulent element may be added, which concretes into a brownish crust. Similar impetiginous crusts may be found in the beard and mustache.

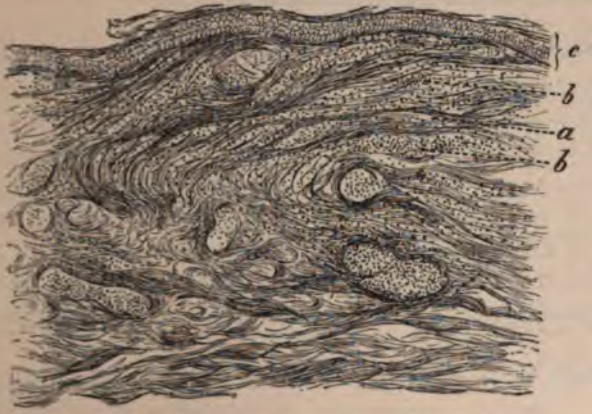


Fig. 1.—Part of a syphilitic macule. × 125 (Crocker).

a, connective-tissue bands of the corium separated by the cell effusion; *b*, *b*, which is chiefly in foci in the course of the vessels; in the upper part of the corium the individual fibers are separated by the inflammatory effusion, and the papillæ are flattened out; *c*, normal epidermis.

ANATOMY.—The anatomy of the syphilitic macule has been studied by Biesiadecki, Kaposi, Neumann, Crocker, and others. According to Crocker (Fig. 1), the change is limited almost entirely to the upper layers of the corium, mainly the papillary, in rather a sharply defined area. The epidermis is raised up as a whole, but the cells of the horny layers and rete are normal, as a rule, except where the effusion is greatest and stretches them. Here there may be some elongation of the lowest cells, which may even be so disturbed that the defined line at the junction of the epidermis and capillary layer is lost, the papillæ ar more or less flattened out, the fibers of the corium are separated, presumably b the fluid effused, so that the individual fibers can be made out. The contras between the upper part of the corium with its separated fibers and the norma corium below is very distinct, but there is only moderate leucocytic infiltration and this almost exclusively round the vessels of the superficial plexus, with their papillary branches; the capillaries and small arteries are moderately dilated, and both stuffed and surrounded with cells; in the walls of the capillarie are prominent nuclei, and there are round spindle-cells in the adventitia of th larger vessels, as was first described by Biesiadecki. There is slight cell effusio around the hair and sebaceous follicles and sweat-ducts when they lie in th upper part of the corium, but the sweat-glands and all the structures in th deep part of the corium are normal. Kaposi saw caudate cells in the connective tissue of the papillæ, and Neumann affirms that the change goes righ down to the fat. The latter also observed granular pigment in the upper par of the corium, but only in the exudation cells.

Diagnosis.—The erythematous syphilide, although usually quite characteristic, may be confounded with the eruption of rubeola, scarlatina, th erythema following the ingestion of mercury, copaiba, and other drugs with herpes tonsurans maculosus, pityriasis versicolor, etc. The differential diagnosis, however, is seldom attended with much difficulty. Th abundance of the syphilitic eruption upon the chest and abdomen, th exemption of exposed surfaces, such as the hands and face, the existenc of induration at the point of contagion, and the frequent presence of enlarged lymphatic glands, usually enable us to readily recognize its specifi nature.

Objectively, the macular syphilide most closely resembles the eruptio of *measles*. The first appearance of the latter upon the forehead, th suffusion of the eyes, and the catarrhal and bronchial symptoms are sufficient to make the differential diagnosis.

The eruption of *scarlatina* is recognized by the accompanying general hyperæmia of the skin, its punctate character, the high fever, an the characteristic condition of the tongue and throat.

The erythematous eruption occasionally following the internal or external use of *mercury* is confined to certain localities rather than disseminated, and careful examination reveals the presence of numerous minu vesicles. The eruption is itchy, of a bright red color, and promptly disappears after the cessation of the drug.

Roseola balsamica, which may occur after the internal use of copaib cubebs, turpentine, etc., has been confounded with syphilitic roseola, an the resemblance of the two eruptions misled the older writers to asse that both gonorrhœa and syphilis were of similar origin. The erupti produced by these drugs consists of rounded or irregular patches, sometimes coalescing, but usually separated from each other by interspaces of normal skin. These patches are elevated, rosy red in color, and give rise to intense burning and itching. Upon the erythematous surface wheals are often developed. With the roseola balsamica, the temperature of the skin is raised and its appearance is accompanied by gastric disturbance. It usually is first seen upon the dorsal surfaces of the hands and feet, and about the articulations. All eruptions due to the ingestion of drugs manifest one distinctive feature—they disappear promptly upon the discontinuance of the exciting cause.

In its declining stages the syphilitic roseola may be mistaken for *pityriasis versicolor*. In the latter affection, however, the stains are lighter brown in color, are not affected by pressure, and are usually found in the form of confluent patches on the back and chest. Furthermore, the pigmentation of pityriasis versicolor is situated in the epidermal cells and may be removed by scraping or washing, while the syphilitic spots are unaffected by these means. A microscopical examination of the epidermal scales will remove all doubt.

From *herpes tonsurans maculosus* the syphilitic roseola is differentiated by the acute onset, the scaling, and the subjective symptoms of the former affection.

Prognosis.—The prognosis of the erythematous syphilide is a favorable one. The eruption represents the most benign expression of the cutaneous manifestations of syphilis, and as it is habitually seated upon nonexposed parts and rarely presents subjective symptoms, it is neither disfiguring nor compromising to the patient and causes no inconvenience. It disappears spontaneously, and promptly responds to the influence of specific treatment.

The eruption has little prognostic significance, so far as the ulterior manifestations of syphilis are concerned; the first crop of roseola does not foreshadow the character of the succeeding crops. When, however, the disease continues to recur during several months in the form of erythema, unaccompanied by deeper lesions, it is a favorable prognostic sign, since it is supposed to indicate a strong capacity of resistance on the part of the individual, and therefore a milder form of syphilis.

THE PAPULAR SYPHILIDE.

The papular syphilide, in the extent of its distribution, the variety of its lesions, its prolonged continuance, and its pathological significance, is the most important of the group of secondary eruptions.

It usually makes its appearance from the fourth to the sixth month—rarely before the end of the third month—and its outbreak is sometimes preceded by febrile reaction. It may immediately succeed or develop coincidently with the erythematous form, or it may be indefinitely postponed by early antisyphilitic treatment. Recurring crops of the eruption may appear during the entire secondary stage, and even in the early tertiary stage, and it often merges, by insensible gradations of papulo-tubercles, into the tubercular form. While the earlier eruption is generalized, superficial, and resolutive, it is often, at a later stage, limited to the production of isolated groups of papules, the lesions involving the whole thickness of the derma, and disappearing by a process of ulceration and loss of substance.

The chronological period of the papular syphilide is subject to wide variations. While in the immense majority of cases it is not prolonged beyond the first two years, yet exceptionally it may continue to recur under one form or another, for several years. In late syphilides of the papular type the eruptive elements are no longer disseminated, but are limited to certain localities and disposed in groups with a circular configuration.

The papules consist of a distinctly circumscribed nodular elevation firm and solid to the touch, from the size of a pin's head to that of a lentil, sometimes considerably larger, resting upon an erythematous base In form they may be either prominent or flat. In certain cases th papules tend to increase much beyond their ordinary dimensions, sometimes attaining the size of a silver dollar, or even larger. As the proces of involution always begins in the central portion, they thus assume ringed or circinate form which is quite distinctive. The color, at firs bright red, changes to a brownish or purplish red and gradually fade When the papule attains its full development it is covered by a dry, shining skin, exceedingly tense over the surface from the cellular infiltration and which, upon desquamating, leaves a sort of collar of broken, partl detached epidermis around the periphery.

While the papular syphilide may be distributed over the entire surfac of the body, involving the trunk, head, and limbs, it manifests a predilection for certain regions. The dissemination of the lesions is generall regular, but in certain localities they show a tendency to become masse and more compact, as, for example, upon the brow, along the naso-labia folds, beneath the mammary gland, and especially about the natural orifices, as the mouth, the anus, and the genital parts.

The papular lesions are markedly modified in their objective characters by the structural peculiarities of the tissues upon which they are situated and their stage of development. Upon the general integument th papules are dry and desquamating; upon the hairy scalp they appea scabby; where the skin is in folds, and opposing surfaces are maintained in contact, as about the mammary glands and in the genital and ana regions, the papules are moist, the desquamation being replaced by viscid secretion, and the lesions often taking on an exuberant development, sometimes attaining large dimensions. Where the epidermis is thick and corneous, as on the plantar and palmar surfaces, they assume a peculiar scaly form, which has been compared to that of psoriasis, and has given rise to the designation of *psoriasis plantaris and palmaris.*

At the angles of the mouth and the interdigital folds they are apt to crack, giving rise to deep rhagades or fissures which are exceedingly painful, and, when the feet are involved, interfere with locomotion. In certain localities they manifest a marked tendency to repeated recurrence and a most inveterate obstinacy to treatment. Upon the palms and soles, for example, they may persist in presenting much the same aspect for years.

Anatomy.—According to Cornil, the microscopic examination of early syphilitic papules shows very distinctly the evidences of inflammation, deeper than would at first be supposed. Examination of thin sections of the skin at the seat of the papule shows the surface slightly elevated, the superficial epidermis sometimes increased in thickness, sometimes partly desquamated, the most superficial layers of cells being deficient.

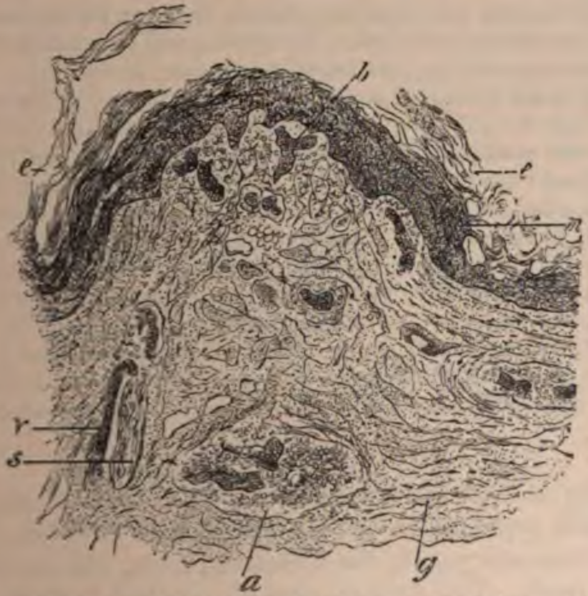


Fig. 2.—A syphilitic macule of the first period of the secondary lesions. × 80 (Cornil).

e, superficial epidermis; *m*, rete mucosum; *b*, vessels of the papillæ; *r*, vessels of a sudorific gland; *s*, *s*, spaces filled with pus around the vessels; *f*, lymphatic cleft; *g*, fasciculi of fibers of connective tissue separated by normal cells.

Fig. 2 shows the superficial epidermis *e e* arrested at the base of the elevated papule, and the pointed summit of the papule presents on its surface a layer of corneous epidermis reduced to half its thickness. The Malpighian layer is a little thickened. Beneath the rete mucosum are found the vessels *b* filled with blood. The capillary vessels *v* which surround the sudorific glands, as well a the vessels of the derm, are also filled with blood. The connective tissue of th papillæ is normal; sometimes around the capillary vessels we observe numerous effused lymph-cells in the peripheral connective tissue.

In the deeper connective tissue the ducts and lobules of the sudorific glands and all the vessels of the derm beneath the papule, are surrounded by a more o less thick zone of lymph-cells which have passed out of the vessels and hav collected along their course, separating the fasciculi of fibers of the connectiv tissue.

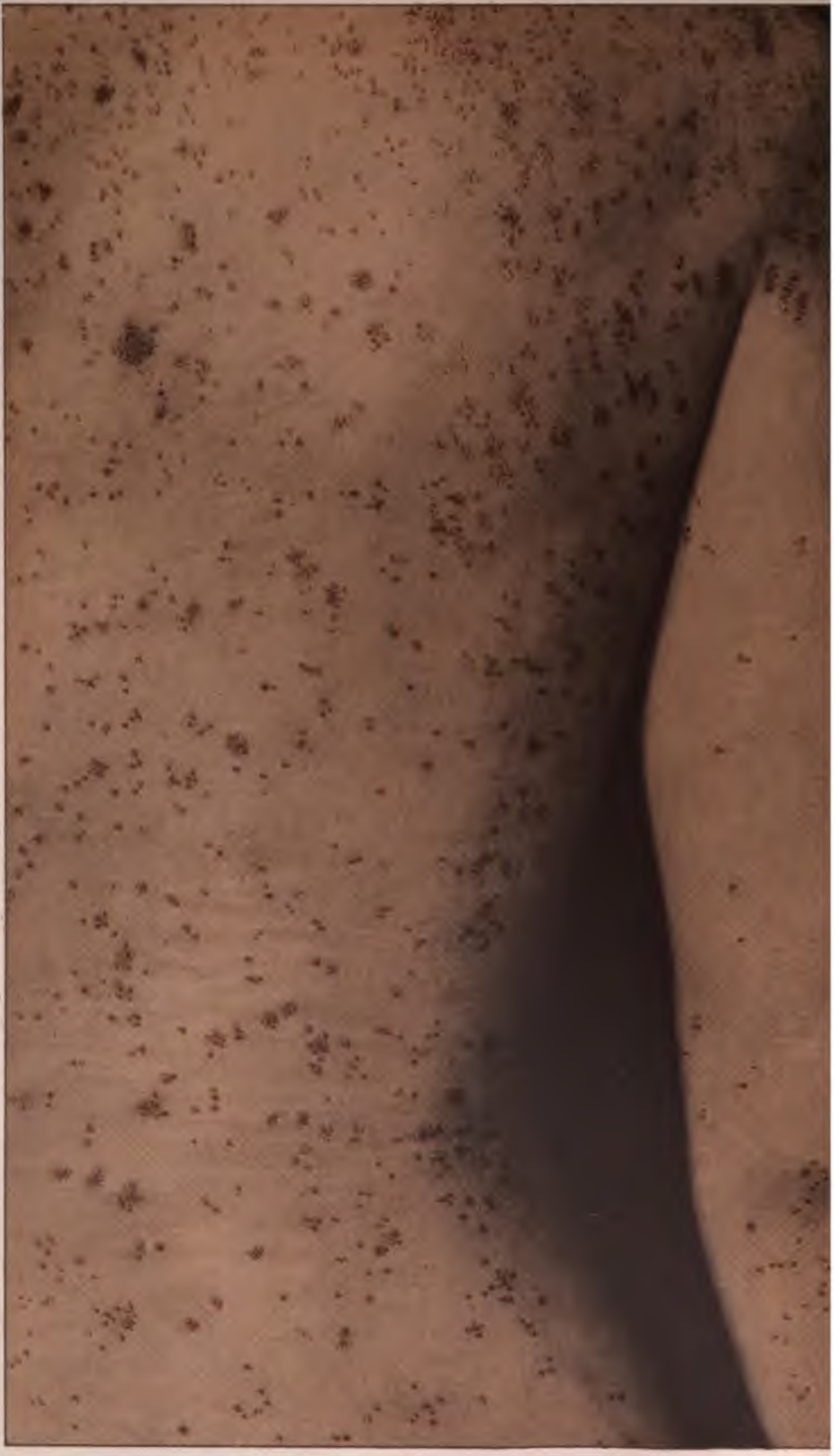
In Fig. 2 are seen islands of lymph-cells, relatively large collections surrounding the blood vessels at *a a*. The fasciculi of fibers of the connectiv tissue show in this drawing their normal arrangement and interlacing. Th migration of white blood-corpuscles is very limited, confined to the area aroun the blood-vessels. It is noticeable that the inflammation, though not intense, i not limited to the superficial layers of the skin or to the papillæ, but extend deeper into the dermic layers: as far as the region of the lobules of the sudorifi glands and of the subcutaneous cellulo-adipose tissue. In this lesion the cor nective tissue of the derm is not changed, but retains its proper elasticity, and i swollen only by the vascular congestion and by the effusion of cells around th vessels. This explains why pressure with the finger in forcing back the bloo contained in the vessels partly causes the redness and tumefaction to disappear but these symptoms reappear as soon as the pressure is removed.

In the squamous lenticular papule the corneous as well as the mucous laye of the epidermis is thickened; the cells of the granular layer and the dentate cells of the rete mucosum frequently present in places an excavated state c their protoplasm; the prolongations of the rete mucosum which penetrate b tween the papillæ are larger than normal, while the papillæ themselves a elongated and hypertrophied. The papillæ are greatly changed by the chroni inflammation; their fundamental substance is infiltrated with small round c lymph cells and cells of the tumefied connective tissue. The fibrils of the cor nective tissue are separated by cellular elements. The papillary vessels a dilated and filled with blood. In the larger, older papules there is not only a inflammation of the papillæ and the superficial corium, but the inflammator process may affect the entire derma and extend into the subcutaneous cellul tissue.

According to their form, volume, and other objective characters, th lesions of this syphilide have been classified as follows: The miliar papule, the lenticular papule, the squamous papule, and the moist papu or mucous patch. This division does not imply four distinct varietie but indicates rather the varying form which the papular type of eruptio assumes according to its location and the mode of its evolution. Not i frequently they may all be found co-existent on the same subject.

The Miliary Papular Syphilide.—The small or miliary papul syphilide (*lichen syphiliticus*) is perhaps the most infrequent variety the papular form of eruption, representing a proportion of less than te per cent. It is somewhat more common in the female than in the male. consists essentially of an infiltration of the follicular structures. It appea

PLATE IV.



MILIARY PAPULAR SYPHILIDE. (Piffard.)

rapidly in the form of minute, conical, or pointed projections, the size of a pinhead or millet-seed, grouped in circles or segments of circles, each group consisting of a collection of from ten to forty lesions. These efflorescent spots are distributed over large surfaces, principally invading the face, neck, back of shoulders, and the sternal region, the intermediary surfaces being free from the eruption. The eruption is at first bright red, gradually fading to a brownish-red, and leaving after the disappearance of the papule a bluish-red stain. During its early stage the summit of each papule may be surmounted by minute pinhead-sized vesicles, which upon drying form an epidermal scale. The vesicular stage of the papules is exceedingly short, lasting only a few days. In some cases the acuity of the process may result in the formation of a minute pustule which dries into a small crust. When this drops off it leaves a minute depression corresponding to the mouth of an excretory duct of a sebaceous or hair follicle. Fresh lesions develop among those already desquamating and the eruption may continue for three or four months before definitely disappearing (Plate IV).

In another variety of the miliary syphilide the papules are larger, more globular, less numerous, and not so characteristically grouped. The epidermal covering exfoliates, and is detached from the summit, forming a white collarette around the base of the lesion. The miliary papular syphilide, instead of being restricted to certain localities, may have an exceptionally extensive distribution. At the present time I have under observation a diabetic patient in whom there was an acute generalized eruption of miliary papules six weeks after the chancre. The lesions are grouped in patches the size of a silver three-cent piece. These groups are so numerous and closely approximated as to be confluent in certain places. The eruption is practically universal. Upon the lower extremities the grouped arrangement is lacking, but the entire surface is thickly studded with dark-red conical projections, giving it the aspect of lichen pilaris. Upon the face, hands, and feet the character of the eruption is different, consisting of larger lenticular papules.

It is quite common to observe, in connection with small papules upon the trunk a coincident eruption of larger papules scattered here and there over different parts of the body.

Diagnosis.—There are a number of papular lesions of non-specific origin with which the miliary papular syphilide may be confounded.

Lichen scrofulosorum, in the size of its lesions and their grouped arrangement, bears a striking resemblance to the small papular syphilide. The papules of the former are of lighter color, either a pale yellow or the same tint as the normal skin, and upon their disappearance do not leave discolored depressions. Lichen scrofulosus occurs almost exclusively in childhood, and the eruption is nearly always limited to the trunk.

The miliary syphilide has a much more extensive distribution, and is accompanied with confirmatory evidence of its specific nature.

Lichen planus may also be mistaken for the small papular syphilide; the efflorescent groups of papules are, however, larger, umbilicated, more strongly pigmented, and quite pruriginous.

Psoriasis punctata. Only in cases where the miliary papules are closely aggregated, and the seat of abundant desquamation, do they bear a resemblance to a diffused patch of psoriasis. The desquamating scales of the specific lesions consist of thin, yellowish epidermal layers which never become confluent like the scales of psoriasis. Minute examination shows that the papules have not coalesced but are simply coherent at their bases, the contours of their summits perfectly distinct and covered with small scales, while the surface of a psoriatic patch is more or less uniformly covered with large, flaky scales. Psoriasis frequently appears upon the hairy scalp, ears, and other localities when the miliary syphilide rarely occurs.

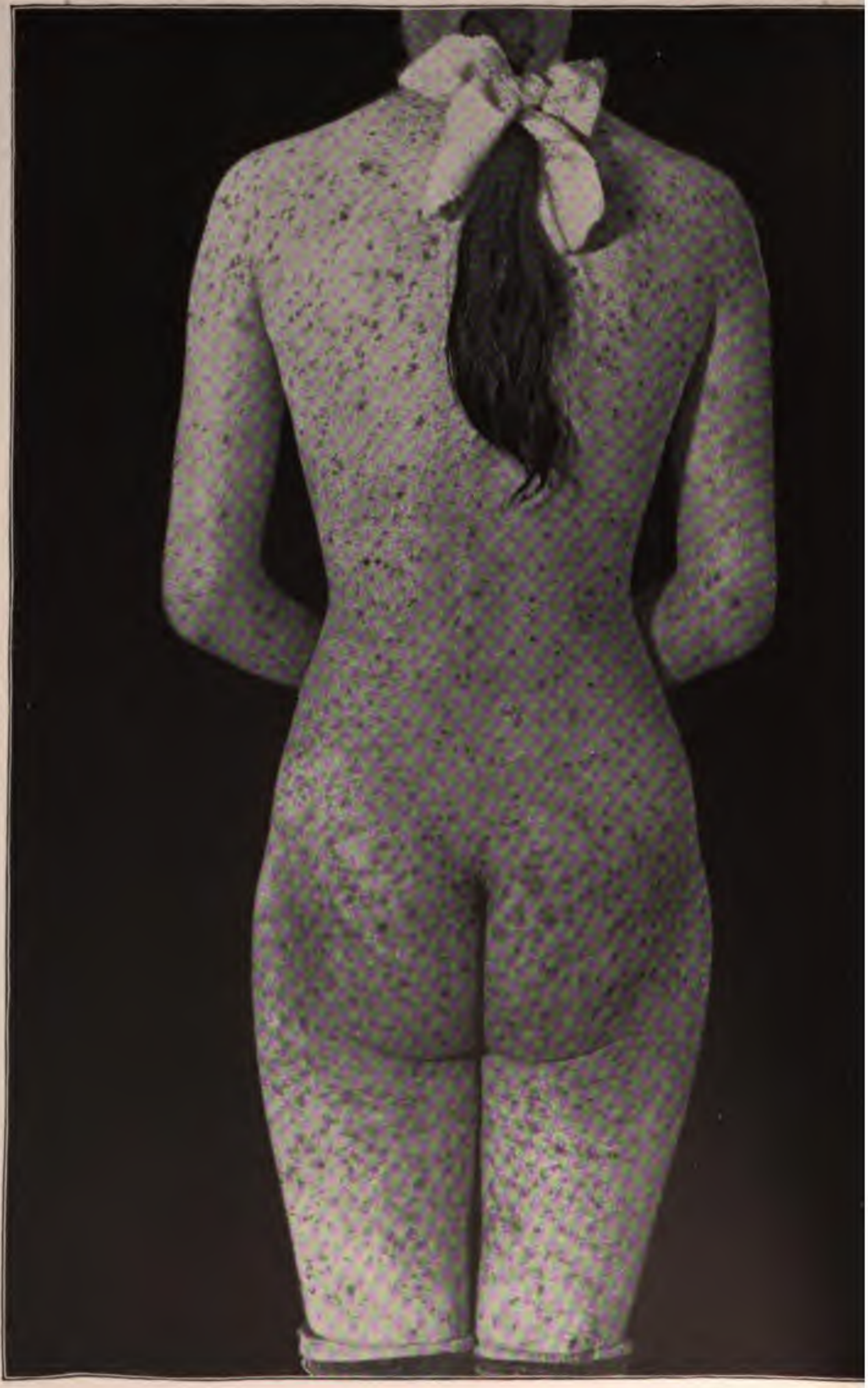
Herpes circinatus has been mistaken for the small papular syphilide when it assumes a distinctly rounded or circinate configuration. The vesicles of the former are quite evanescent, drying up into small scales and forming a circle of scales upon a slightly inflamed base. The disease undergoes rapid involution under local treatment. Microscopical examination of the scales, revealing the presence of the characteristic spores, would remove all doubt.

From *scabies*, which it may resemble somewhat, the miliary papular syphilide may be readily differentiated by the acute itching accompanying the former—the excoriations caused by the violent scratching and by finding as its causative factor the *acarus scabei*.

Prognosis.—Although the miliary syphilide is often rapid in its development, giving rise to the designation of the "acute miliary syphilide," it is chronic in its course and slow in its evolution, often persisting for several weeks without notable modification. It does not seem to be so readily amenable to the influence of specific treatment as the other forms of the papular syphilide. Relapses are rare. They occur in groups or in the form of circles or arcs of circles. The recurring lesions are usually of the papulo-pustular type.

Two forms of the flat papular syphilide are recognized, the lenticular and the nummular syphilide, the chief element of distinction between them being the size of the lesions. They are distinguished from the preceding acuminate variety by their character of flatness. Compared with the projecting miliary papule the lesion gains in superficial area what it loses in height. The anatomical site of the infiltration in the papillary body, instead of the follicles, determines the difference in form.

PLATE V.



Lenticular Papular Syphilide (Piffard).

The Lenticular Papular Syphilide.—This eruptive form is by far the most common and characteristic of the secondary manifestations of syphilis. The papules are rounded or oval, flatly convex, with sharply defined borders, and but slightly elevated. The color, at first bright red, later assumes a burnished or coppery hue. In no other lesion is the syphilitic trait so characteristically displayed. The lesions are at first small, and only gradually attain their complete development. As the papule advances in its evolution the surface undergoes a metamorphosis, the epidermis becomes shiny and red, and breaks in the center and desquamates, forming an epidermal fringe around its periphery. This process of desquamation may take place several times in succession, the papules gradually becoming flatter and finally disappearing by resolution, leaving brownish or bluish-gray spots of pigmentation which are very persistent. The invasion of the lenticular syphilide, though often preceded by an eruptive fever, is not nearly so rapid as the "acute papular syphilide." A few lentil-sized spots appear upon the forehead, the nape of the neck, or the abdomen, and the eruption extends by the development of new spots and the gradual implication of the different parts of the body until it becomes more or less generalized, usually requiring one to two weeks for its full development. The eruption comes out in successive crops, which may continue to recur during the first eighteen months or two years of the disease. It not infrequently happens that there is a *poussèe subintrante* before the former crop has undergone complete resolution, and there are thus present at the same time papules of various ages and different stages, of development (Plate V).

The distribution of this syphilide is most extensive; it may be disseminated over the entire integument. Its regions of predilection are the forehead, the back of the neck and shoulders, the sacral region, and the bend of the elbows and knees, where they often tend to coalesce. They are quite common upon the palms, rarely found upon the dorsum of the hands and feet, but over the arms they are less numerous than over the forearms. The development of the lesions upon the brow along the margin of the hairy scalp constitutes a distinctive feature, known as the *corona veneris.*

In the earlier months the entire surface of the body may be thickly studded with the eruption, the papules sometimes running together and spreading in a continuous sheet over large surfaces, but with each successive outbreak there is a diminution in their number with a progressive increase in their size. The later outbreaks are limited to the production of a few papules, grouped in circumscribed localities, which have a tendency to assume a circular configuration. In certain regions, as upon the prepuce and sheath of the penis, the papular efflorescences, which are more or less configurate, forming discoid or annular patches, may eral sur-

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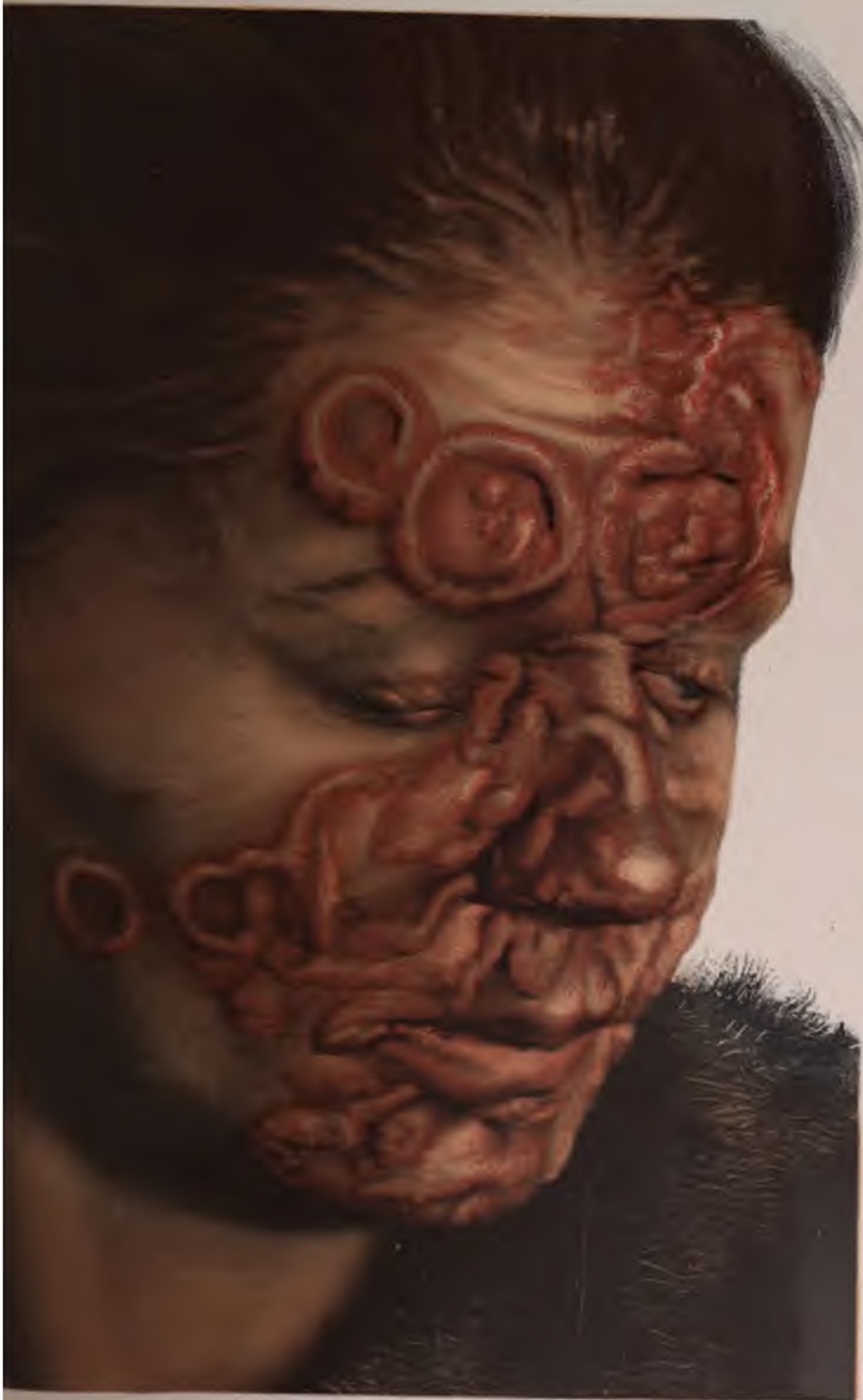
PLATE VI



CIRCINATE SYPHILIDE. (from photograph by Piffard.)

appear precociously before there is any eruption upon the general surface.

The Nummular Syphilide.—Under the designation of the large papular or nummular syphilide is included a variety in which the papules, while preserving the general characteristics of the flat papule, are distinguished by their larger dimensions, often attaining the size of a silver half dollar, or even larger.

The lesions present a firm, well-defined border, with a smooth, plain surface. Sometimes the margins are elevated, with a shallow depression in the center, which gives them an umbilicated appearance. The desquamating epidermis is detached from the center and forms a peripheral fringe. The tendency to repeated desquamation is quite characteristic of this, as it is of the lenticular papule. In the course of the retrogressive metamorphosis the nummular papule often undergoes a transformation into the annular papule. The umbilicated character of the lesion becomes more accentuated by atrophy of the central portion, which gradually disappears, while the peripheral margin remains hard, elevated, and scaly, resulting in a ring-shaped wall of infiltration inclosing a smooth, depressed center. A similar circinate configuration may result from the linear contact of smaller papules developed in the form of a circle.

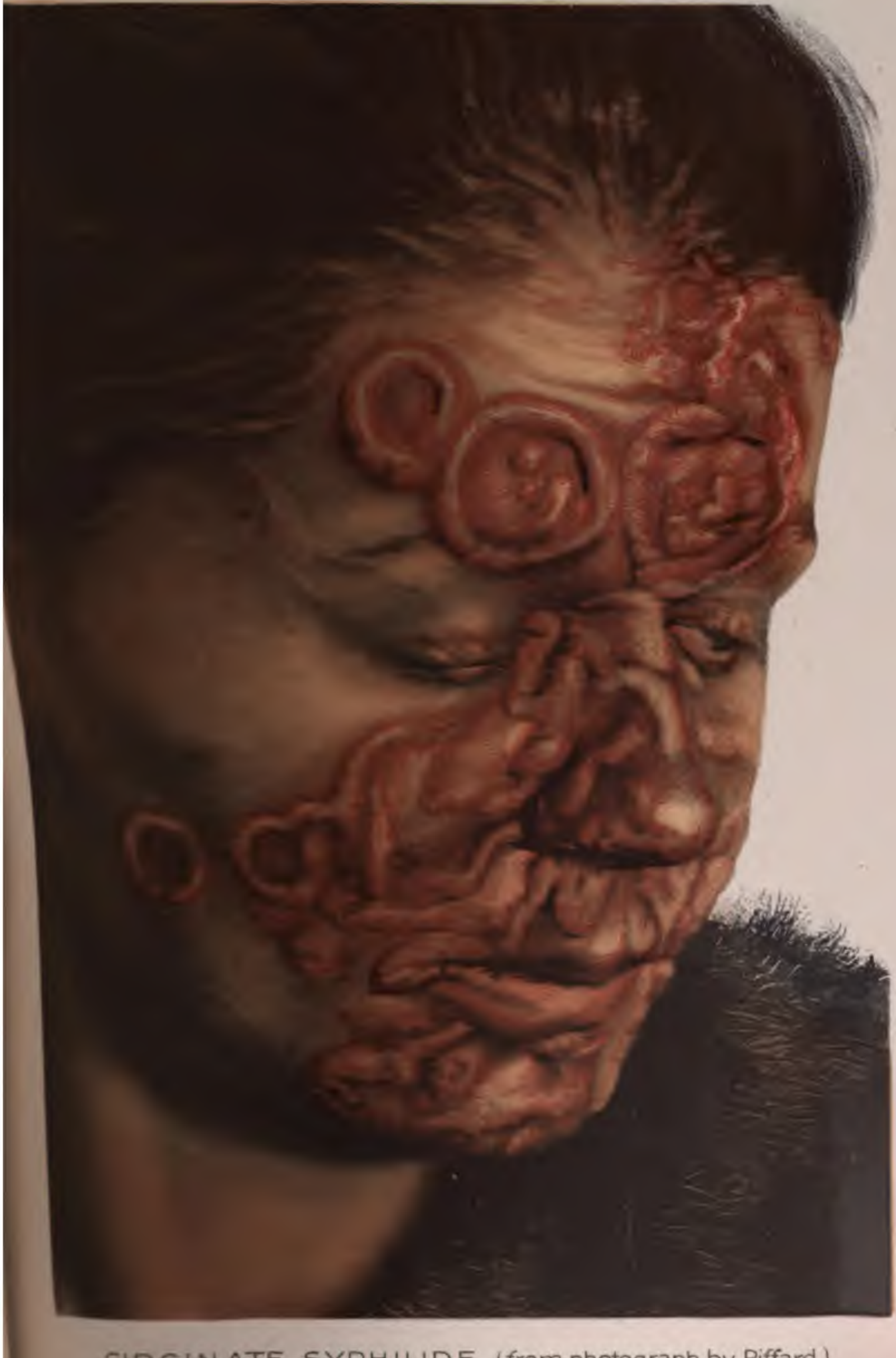
Instead of the circinate or discoid form, the papules may be arranged in sinuous or serpentine rows, which by their confluence give to the eruption a peculiar figured or gyrate form.

Still another irregular form, known as the stellate syphilide, or the *syphilide en corymbe*, is produced by the circular grouping of small papules around a large papule as a center. These smaller "satellite" papules, as they are termed, are disposed in a system with almost geometric regularity. As a rule they are discrete, and separated by sound skin; they may, however, become confluent, forming a circular nappe of infiltration around the central lesion.

A polycyclic configuration, designated as the *syphilide en cocarde*, may result from the development of one or more concentric rings encircled by a larger ring.

The intricate and eccentric forms assumed by the papular syphilide from the intersection and interfusion of circular, semilunar, and elliptical patches, give to the eruption a most bizarre appearance, which is admirably shown in Plate VI.

The chronological period of the large, flat papule is ordinarily toward the end of the secondary stage, and it is described by many writers as an intermediary syphilide. Exceptionally it may occur as an early manifestation. While the individual lesions are few in number, they have an extensive distribution. It is most characteristically developed upon the face, nape of neck, the genital parts, and the palmar and plantar surfaces.



CIRCINATE SYPHILIDE. (from photograph by Piffard.)

In the genital region they are moist, with a sero-purulent, offensive secretion, and become the seat of fissures and superficial ulcerations.

The Papulo-squamous Syphilide.—Under the influence of various causes, syphilitic papules undergo certain modifications which impart to them a characteristic physiognomy of great interest from a clinical point of view. One of the most important modifications of the papular type is represented by the papulo-squamous syphilide (Plate VII). Its essential features consist in a thickening of the superficial layer of the skin, with marked proliferation of the epidermal elements. Instead of the ephemeral desquamation, which is common to all papules in the process of involution, there is an accumulation of epidermic scales which rest in place, forming a sort of scaly covering strikingly suggestive of psoriasis, and which has led to the designation of this syphilide as syphilitic psoriasis. The scales are of a dirty grayish tint, dry, thick, and usually friable. Sometimes they are hard, horny, compact, and closely adherent. Any or all the varieties of papular syphilide are susceptible to this squamous process. A papular eruption may present this psoriatic physiognomy from the first, or it may be impressed upon the lesions secondarily at a later stage of their development, or not until the period of their decline. (Plate VIII, large papulo-squamous syphilide).

Clinically, it is observed that papules of the late secondary or intermediate stage, which are ordinarily of larger size and more deeply situated, are more apt to exhibit this tendency to epidermal thickening and exfoliation, so that the chronological element is an important factor in the production of this morphological feature. Again, it has been observed that the squamous tendency is more apt to be manifest in certain regions. Thus, upon the face, along the eyebrows and chin, the naso-labial and the naso-jugal furrows, and especially upon the palms and soles, the tendency of papules to become scaly is manifest. But, independent of these regional predispositions which are constituted by structural peculiarities, a predominant influence must be attributed to idiosyncrasy, since it has been observed that in certain persons all papular lesions, irrespective of their age, dimensions, or locality, are characterized by an excessive scaliness. This psoriasiform aspect of syphilitic lesions has led many authorities to regard them as a combination of psoriasis and syphilis, or a syphilis ingrafted upon a psoriatic diathesis. In opposition to this view it may be said that many syphilitics in whom the squamous type of eruption is most pronounced have never had an attack of psoriasis.

The mildest expression of the squamous process, and one which from its comparative rarity possesses but little clinical importance, is termed *syphilitic pityriasis.* It consists essentially in a desquamation from irregularly distributed, rounded or annular, slightly elevated surfaces, of minute furfuraceous or branny scales. A more pronounced scaliness is often seen in the papular syphilide of the face, which is characterized by a granulo-squamous proliferation of the surface, each of the papules being surmounted by a dry, hard, horny concretion of a grayish color.

As before intimated, the squamous element is most characteristically developed in the larger and more persistent papular lesions of the late secondary period. By the contact and fusion of the annular patches are formed festooned and gyrate figures, covered with dry, more or less thick, friable, and compact scales, which are closely adherent, and which bear a most striking resemblance in objective characters to *psoriasis figurata* or *gyrata*. In other cases there is an agglomeration of papules, forming large masses or infiltrated patches of considerable dimensions, the surface covered with white adherent scales.

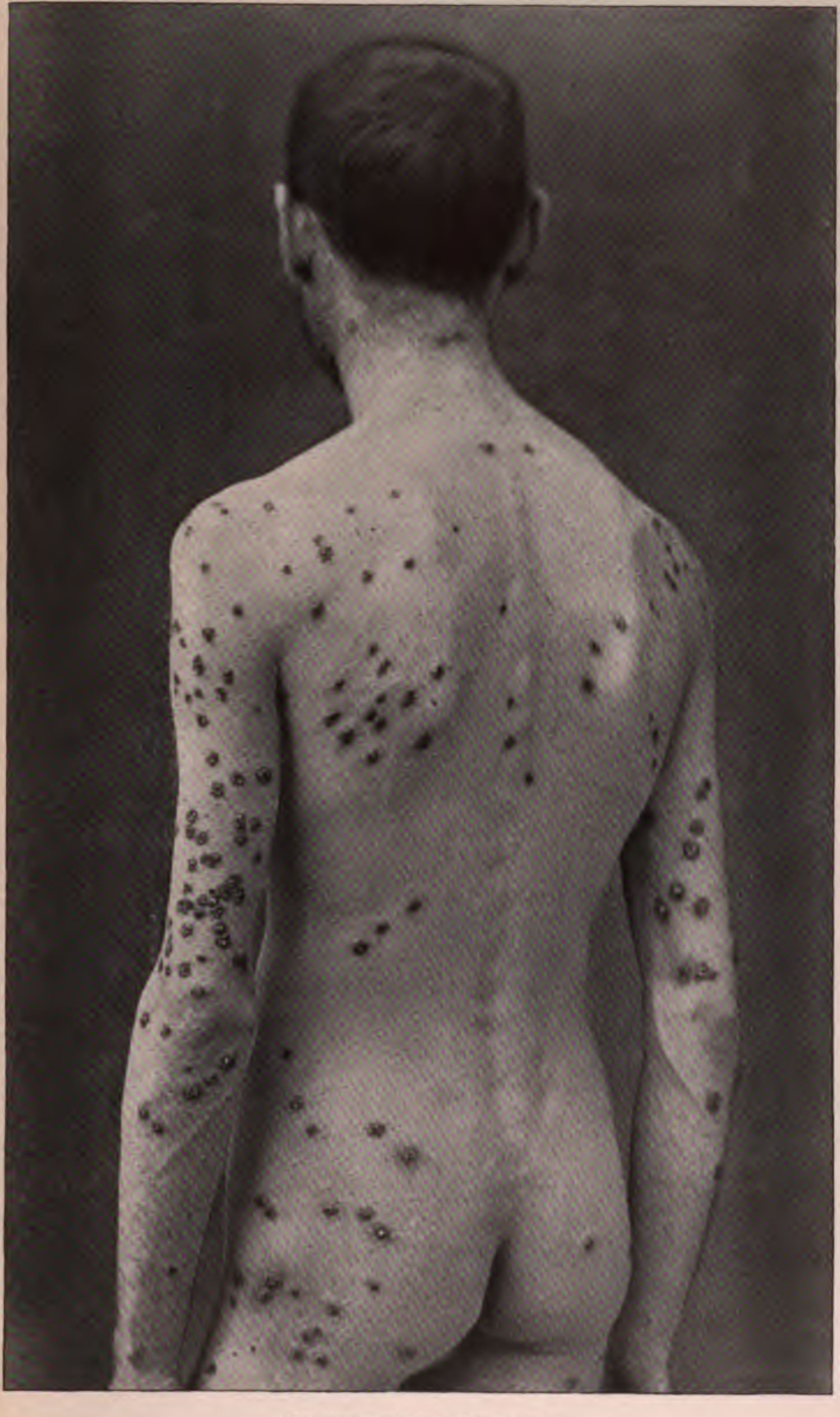
Upon certain regions, the alæ of the nose and around the mouth, especially the upper lip, and about the genital organs, there is often a papillary hypertrophy in addition to the epidermic proliferation, which gives to the lesions a warty, papillomatous character, known as the *syphilide papuleuse végétante*, which will be described in detail later on. The surface of the vegetating papules is ordinarily covered with scales and yellowish concretions chiefly composed of sebaceous secretions from the glands so abundantly present in these localities. Upon the hairy regions of the face the epidermic *débris* is often mingled with the secretion of the lesion, forming a crust rather than a scale, constituting the *papulo-crustaceous syphilide*.

Diagnosis.—The diagnostic features of the lenticular syphilide are so characteristic and typical that it may, as a rule, be readily differentiated from other papular eruptions. Its color, localization, symmetrical development, the absence of subjective sensations, and the frequent association of other signs of syphilis in the shape of glandular enlargements, alopecia, and mucous patches, resolve all doubt as to its specific nature.

In the later relapsing stages, when the eruption is sparsely developed in the form of large papules, which have a tendency to become scaly and assume the aspect and configuration peculiar to *psoriasis*, the diagnosis may be difficult. Syphilitic lenticular lesions may resemble those of psoriasis guttata, larger papular lesions those of psoriasis nummularis; circinate lesions those of psoriasis orbicularis. It is especially the large papulo-squamous lesions of comparatively late development, which by their contact and coalescence assume a configuration so strikingly suggestive of the figured and gyrate forms of psoriasis, that present the most deceptive resemblance, and are most difficult of differentiation.

When, however, the lesions are minutely examined, differences in the character of the scales and the condition of the subjacent infiltration will be at once noted. The syphilitic scales are smaller, thicker, less abundant,

PLATE VII.



Papulo-Squamous Syphilide.

of a dirty gray color, and often do not entirely cover the lesion. The scales in psoriasis are larger and more lustrous, of a silvery or whitish appearance, distinctly imbricated, and more freely produced and shed. When the scales are detached from a syphilitic papule there is revealed a circular neoplastic infiltration, elevated at the border, dry, and of a reddish-brown or coppery color. When a psoriatic patch is denuded of scales there is presented a reddish surface with a number of hyperæmic bleeding points. In a psoriatic eruption there are commonly found, mingled with the older patches, recent guttate lesions, which are so characteristic as to be readily identified.

In addition, the localization of the eruptions possesses diagnostic significance. Psoriasis exhibits a predilection for the extensor surfaces—the elbows, knees, and scalp—in marked contrast with the preference of the papular syphilide for the flexor surfaces—face, neck, and anterior aspects of the limbs. Upon the hairy scalp psoriasis occurs in the form of isolated or confluent patches, covered by an accumulation of massed-up, mortar-like scales; while syphilitic lesions in this region are apt to be of a pustular character, and covered with crusts or scabs. Finally, inquiry into the history of the psoriatic patient will in many cases disclose the fact that he has suffered from preceding attacks of the same form of eruption.

The circinate papular syphilide, when covered with yellowish, greasy epithelial scales, may present a striking resemblance to the annular patches of *seborrhœa*. Reference has already been made to the possibility of the coexistence or combination of the two morbid processes in the same individual. The elements of diagnosis must be sought for in the history or presence of concomitant specific symptoms rather than in differences in the objective characters of the lesions.

Palmar and Plantar Syphilides.—On account of the thickness of the epidermis of the palms and soles, syphilitic papules in these localities present such marked modifications in form and aspect that by most writers they are described as a separate variety, under the designation of palmar and plantar psoriasis. They have a special clinical interest and importance, from the fact that they bear such a close objective resemblance to the lesions of psoriasis and eczema in these regions that it is difficult to differentiate them. They are further characterized by their tendency to frequent recurrence, their continued development at an advanced stage of the diathesis, and finally by their obstinate and refractory behavior when subjected to specific treatment. The chronological period of this syphilide is indefinite; it usually appears from three months to one year after the initial lesion, and may continue in one form or another to the tenth year, or even later. It forms an exception to the general rule that lesions of a distinctly papular type have a chronological limit.

The anatomical conditions which determine such marked modifications in the objective characters of palmar and plantar lesions are the firm adherence of the cutis to the subjacent fascia, and the thickness and nondetructibility of the corneous layer. On account of the resistance of the epidermis the papules are flat, with scarcely an appreciable elevation. They first appear as dull red or almost colorless circumscribed spots, from the size of a pea to that of a finger-nail. They usually first develop in the center of the palms, and extend by concentric circles or with a serpiginous course to the periphery. They sometimes creep up over the lateral surfaces of the hands and feet and the interdigital spaces, but rarely appear upon the dorsal surface. The epidermal covering is gradually lifted up, broken, and partly detached in a dirty white lamella, which adheres at the edges, leaving in the center a bright red circular or angular spot surrounded by a border of undermined skin.

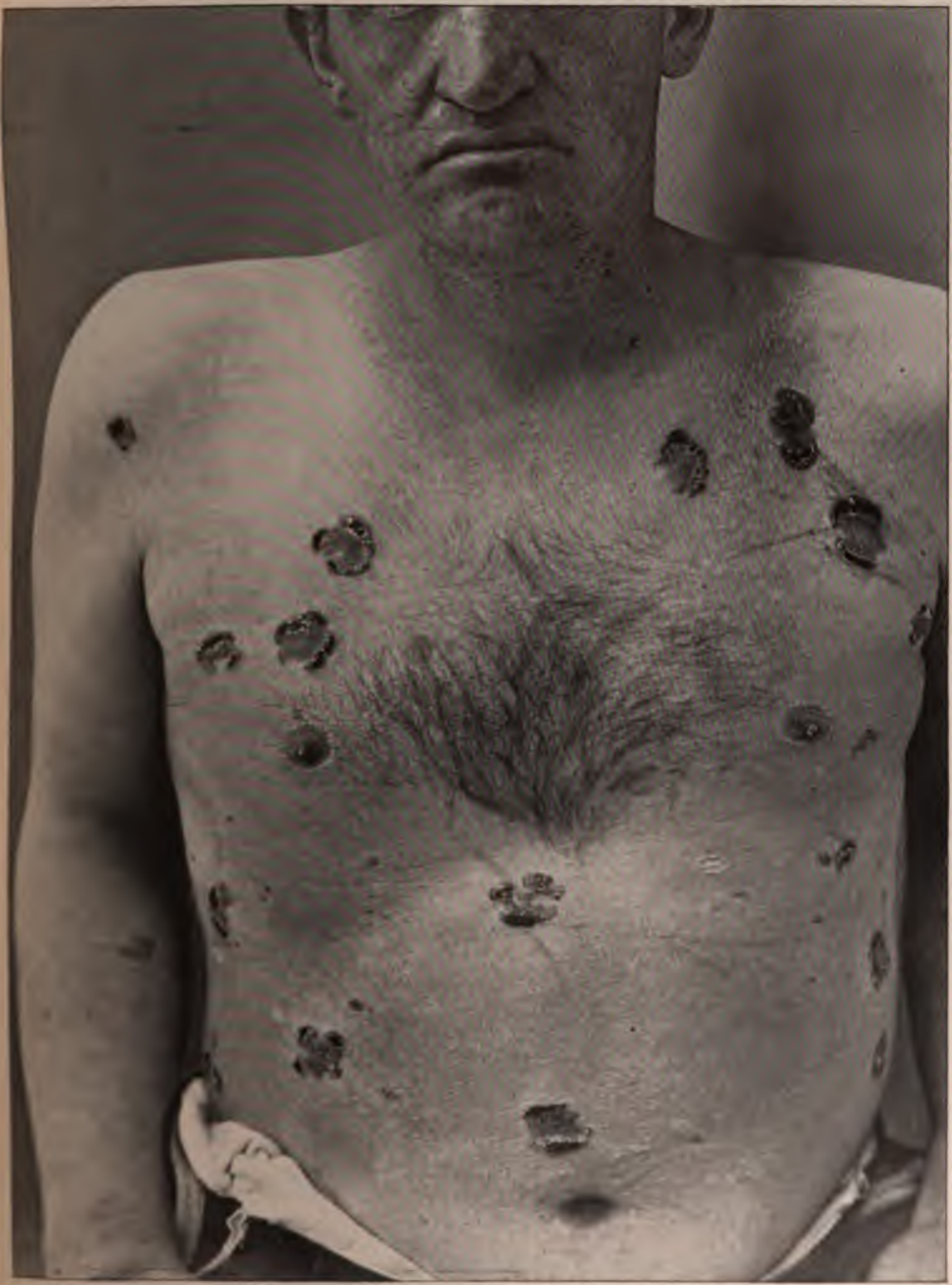
In a variety designated by many writers as the *corneous syphilide*, which is more common upon the palms than the soles, the pathological modifications seem to be centered in the corneous layer, which is elevated in the form of extremely hard conical projections of the epidermis. These horny, epidermal concretions may be dug out of the skin, leaving small crateriform depressions. The circular pits corresponding to each papule may give it the appearance of being punched out with an instrument. Under the same designation Zeissl describes "a diffuse affection of the epidermal strata of the hands and feet, which consists of a uniform, diffused, rapid degeneration of the most superficial layers of the skin, whereby the affected places look as if the epidermis were transformed into a fine, whitish silver brocade."

The papules, instead of remaining discrete, may coalesce, forming circular or crescentic patches, which show a tendency to heal in the center while advancing by the development of new papules in the periphery. The fusion of the papules and this serpiginous mode of extension may convert the entire palm into a diffuse lesion—the somber-red base corresponding to the parchmentlike derma—with active desquamation going on in the scalloped infiltrated borders which surround it. This desquamative process may continue for months without other active signs of eruptive disorder.

In the natural furrows of the palms and fingers deep cracks or fissures are apt to occur, sometimes extending down into the true skin and occasioning much pain and inconvenience. The chronicity of syphilides in this region is no doubt largely due to the fact that the lesions are constantly aggravated by pressure, friction, and other causes of irritation to which they are exposed.

Plantar syphilitic lesions, while not so common, often coexist with those of the palms, and present essentially the same objective characters. From the fact that the soles are comparatively protected, and not exposed

PLATE VIII.



Annular Papulo-Squamous Syphilide (Fordyce).

to so many causes of external irritation, the lesions are not so persistent. On account of the great thickness of the epidermis in this region, when fissures form they are apt to be deep and exceedingly painful, and not infrequently become of the seat of extensive ulcerations which are extremely difficult to cure.

The earlier palmar and plantar syphilides are usually symmetrical, but in a more advanced stage only one palm or sole may be affected.

Diagnosis.—The designation of the papulo-squamous syphiloderm of the palms and soles as *palmar* and *plantar psoriasis* would indicate a marked resemblance or identity of the objective characters of the lesions of the two diseases. Practically, however, the identification of the syphilitic character of the eruption is rarely attended with difficulty, since psoriasis occurs with such extreme infrequency upon the palms and soles that it may be excluded from consideration. Psoriasis is never strictly limited to these regions, but when found here is always associated with a development of the disease upon the extensor surfaces of the knees or elsewhere. On the other hand, the palms and soles are a favorite seat for the papulo-squamous syphilide, which becomes, so to speak, domiciled here, and may constitute the sole sign of the disease for years. In fact, it may be said that a psoriasiform eruption upon the palms is almost pathognomonic of syphilis.

The dermatosis with which syphilis of the palms is most apt to be confounded is *eczema*. When the syphilide occurs in the form of discrete papules, a mistake is not liable to be made: the dusky red infiltrated spots deprived of epidermis, with their peripheral scaly fringe, are quite characteristic; but when the papules coalesce, forming large, diffuse patches of infiltration with a sweeping circinate border, the resemblance to certain forms of chronic squamous eczema is most striking. Usually, however, a differential diagnosis may be made by a consideration of the following points: Syphilis generally begins in the middle of the palm and spreads centrifugally by the contact and fusion of new papules; the coppery wall of infiltration which marks its advancing border is scalloped and irregular; its outer edge sharply defined, and terminating abruptly against the healthy skin. Eczema usually begins first on the wrist or root of the thumb or fingers, or it may first appear on the dorsum of the hand or fingers, where syphilis is rarely found. The eczematous infiltration, if of long duration, is more uniform and evenly distributed; the margin of the eczematous patch is more regularly curved; and the infiltration does not terminate so abruptly, but shades off into an erythematous redness of the surrounding skin.

Eczema is further distinguished by its severe itching, the history of discharge, moisture, and its characteristic crusts. Itching of the affected surface is absent in syphilis. The only subjective sensations result from the accidental cracking and fissuring of the skin. In old cases, however, the differential lines which distinguish the two affections are obliterated, and a positive diagnosis is not possible without resorting to the test of specific treatment. Even this, it must be confessed, is not infrequently disappointing, since of all manifestations of syphilis the palmar and plantar lesions are most refractory to its influence.

The Moist Papular Syphilide.—Another important modification of the papular type of syphilitic eruption is represented by the *moist papule* or *mucous plaque* of the skin. The metamorphosis consists essentially in a loss of the epithelial covering of the papule, leaving a moist secreting surface, hence sometimes designated as the papulo-erosive syphilide. This form of syphilide derives a special clinical importance from its frequency, its tendency to relapse, its diagnostic significance, and from the fact that it constitutes one of the most common sources of syphilitic contagion.

The transformation of the dry into the moist papule is determined largely by the accident of situation and other local conditions. Its development is favored by fineness of the skin and consequent thinness of the epidermis, warmth, the friction of adjacent surfaces, and contact with secretions or exudations. It is found in regions where the skin is thin and delicate and bathed in perspiration, and where contiguous surfaces come in contact, as in the natural folds or creases of the skin, beneath the breast, the navel, in the axillary, inguinal, and genito-crural regions, the interdigital spaces, and especially at the junction of the skin and mucous membrane around the natural orifices, as the anal and genital. It is much more common in women than in men; in the former it not infrequently constitutes the sole manifestation of syphilis during its entire period.

The moist papule ordinarily begins as a flat elevation, circular or discoid in form, varying in dimensions from one eighth to one half inch in diameter, the larger lesions not infrequently presenting a depression in the center with elevated borders, giving them an umbilicated appearance. The epidermal covering, instead of breaking and exfoliating in the form of a dry scale, as in the dry papule, becomes macerated by moisture, and gradually transformed into a grayish, easily detached pellicle. After this is cast off there remains a flesh-colored plaque with a moist secreting surface, soft to the feel like mucous membrane; hence the designation *mucous patch*.

While in most instances moist papules represent a surface modification of the dry papule, yet it is well to bear in mind that they may have a different evolution. They may originate from an erythematous spot, an eczematous erosion, or they may develop *d'emblée* without a pre-existing lesion. The initial lesion may be transformed *in situ* into a mucous patch. They assume a variety of appearances according to their situation and the local conditions to which they are exposed. The surface may become covered with a grayish-white diptheroid layer, or present an uneven, verrucose aspect. The patches may become superficially ulcerated and the seat of a viscid, purulent, extremely offensive secretion. The exudation may become mingled with the epithelial detritus and concrete into a brownish crust, giving them the aspect of pustulo-crustaceous or impetiginous lesions; coincident with these surface changes there is oftentimes a marked hyperplasia of the papillary body, imparting to the papules a distinctly vegetating character, and has led to their designation as *condylomata lata*. Instead of the papules remaining discrete there is commonly a coalescence of contiguous lesions, forming irregularly shaped, flattened masses or cauliflower growths, the surface being broken up by longitudinal or polygonal fissures which channel the mass in different directions. The opinion is generally held that these vegetating masses are not essentially and exclusively syphilitic, but for their production certain local causes are necessary, such as uncleanliness, the contact of irritating secretions, friction, pressure, etc.

Moist papules present great variations in their objective characters according to their situation upon the integument; *beneath the mammæ*, which is a favorite location in fat women with full, pendulous breasts, the papules are large, smooth, circular or crescentic, slightly eroded, or covered with a thin impetiginous crust. Not infrequently they are grouped *within or about the areolæ*. Moist papules about the female nipples have a most important relationship with the syphilis of nurslings, constituting as they do from their ultra-contagiousness, and their frequent opportunities for contact with the infant's mouth, the most common sources of infection in infantile acquired syphilis.

In the *axillæ* the papules are large, erosive, and frequently confluent; in the umbilical folds they are small, moist, and rarely confluent or incrusted.

In the *interdigital spaces*, between the toes especially, the fingers being rarely affected, the papules, owing to the secretion and the pressure of close contact, instead of being simply erosive, are often papillomatous and hypertrophied, with clefts and fissures and deep ulcerations, which often extend along the articular folds upon the plantar or dorsal surface, causing such intense pain as to interfere with locomotion. The secretion from the surfaces is most foul and offensive.

About *the mouth at the commissure of the lips* the papules frequently occupy both the cutaneous and mucous surfaces, and are often complicated with fissures extending more or less deeply into the angles of the mouth, and exceedingly painful. In this situation the cutaneous segment of the patch is covered with a dry, brownish, and fissured crust, while the mucous portion exhibits the frank appearance of the mucous plaque.

It is especially in the *genital regions*, along the scrotum in the male and about the vulva in the female, and around the anus in both sexes, that moist papules exhibit their most characteristic and exuberant development. In the perineal region and upon the scrotum the lesions are rounded, nummular, of a reddish-gray tint, moist and secreting, and generally discrete, although they sometimes occur in grouped patches. Around the anus the lesions are frequently ranged along either side in a longitudinal line, like a row of buttons. Owing to the friction and pressure to which the papules are subjected in this location, combined with the macerating action of the secretions, they often become enormously tumefied, hypertrophied, and fissured, and are attended with more or less itching and burning, with reflex spasm of the sphincter ani.

About the female genitals they may be either isolated or confluent, forming by their aggregation warty, nodular, or cauliflower masses of considerable size. They are frequently complicated with dermatitis, inflammation of the vulvar glands, œdema of the vulva, etc. The labia majora may become enormously infiltrated or hyperplasic, giving rise to a sclerosed rigid condition which in pregnant women becomes a serious obstacle to parturition.

For a more detailed description of syphilitic manifestations in these regions the reader is referred to the articles on Syphilis of the Rectum and Anus, and Syphilis of the Genito-Urinary System.

The chronological period of the moist papular syphilide is usually limited to the secondary stage. If the lesions become hypertrophic and are not subjected to a curative treatment, they may persist almost indefinitely, forming large papillomatous masses resembling frambœsia. While they do not exhibit the same tendency to spontaneous resorption as do other secondary lesions, yet the condylomatous growths sometimes break down and disappear by a process of ulceration, which, however, does not involve the cutaneous tissues upon which they are implanted, so that cicatrization is rarely followed by a loss of substance. Moist papules prove most refractory to the influence of specific mediation. The tendency to relapses and the pertinacity with which they continue to recur constitutes a most aggravating feature. Cases are reported in which they have been observed ten, twenty, and even thirty years after the initial lesion.

ANATOMY.—According to Kaposi, in broad condylomata, as in the syphilitic nodule, a cellular infiltration is present throughout the papillary layer and the corium, which occasionally extends into the subcutaneous cellular tissue and appears to be pretty sharply demarcated laterally toward the adjoining normal tissue. The limits of the papule are indicated by the portion whose morbid condition is marked by the cell infiltration. The papillæ are considerably enlarged, mainly in their longitudinal diameter, terminating above in two or three branches, frequently with club-shaped ends, as seen at *a*.

In the more recent condylomata, as well as in the peripheral part of the moist papule, the mucous layer is considerably thickened, its conical processes are elongated and broadened, as seen at *b*, and is pretty sharply differentiated from the tissue of the papillæ; only through the central portions of suppurating ulcerating papules this distinction becomes obscured, because the granular, almost dusty appearance of the infiltrated papillæ continues into the cells of the mucous layer, the latter is thinned or absent at the ulcerated portions, the mutilated papillæ or the suppurating corium with its vertically ascending loops of papillary vessels being freely laid bare.

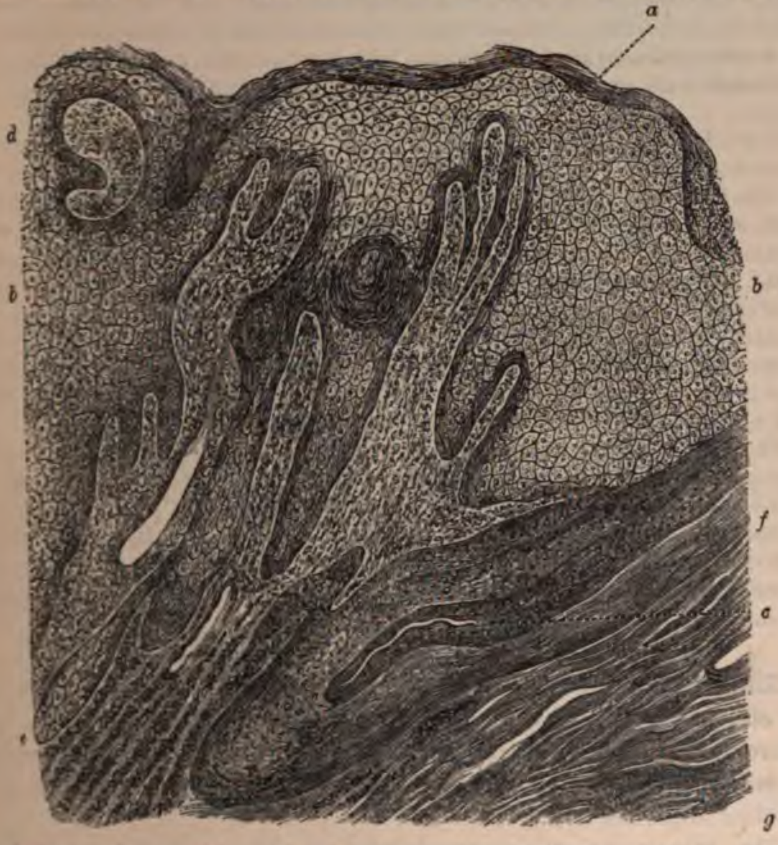


Fig. 3.—Section of flat condyloma taken from living subject (Hartnack, oc. 3, obj. 5). (Kaposi.)

a, club-shaped and branching hyperplastic papillæ; *b*, abnormally developed cells of mucous layer; *e*, corium with cellular infiltration; *c*, hair with hypertrophic external root-sheath; *d*, transverse section of an infiltrated papilla; *f*, *g*, normal dermal tissue, histological limit of the flat condyloma.

Under a higher power it can be recognized that the papillary tissue and the corium corresponding to the extent of the papule are uniformly altered by the cellular infiltration, *a*, *e*.

The cells vary in size and shape; most of them are of the size of a white blood-corpuscle, some are almost twice as large, and many represent only a cell nucleus; among the cells some are roundish, oval, irregular in shape, and some provided with taillike processes.

Both the cell-bodies and the nuclei are, without exception, very granular; this granular appearance of the cell-body continues also into the processes where these are present. Cells may be found whose nucleus seems constricted in the center ; others attract attention by their size, more than double that of a white blood-corpuscle ; in these the pale, gray, glossy nucleus constitutes the major portion of the cell, which exceeds it only by a narrow zone of the cell-body. This nucleus is sometimes found completely split into two. At other points we find within a circular space, resembling one of the latter cells, five or six bodies similar to small cell nuclei, which are grayish, have a dull luster, are infiltrated with granules, and packed close together, seemingly inclosed in a common envelope.

The cells constituting the infiltration are imbedded in a network composed of meshes varying in size and shape, but mostly close, and extending throughout the infiltrated tissue—i. e., the entire papule; one or more cells lie in each mesh, or the latter may be filled by one of the larger cells described above, or by a mass of nuclei (five or six) presumably due to the breaking down of a cell ; partly, however, the cells are imbedded in the trabeculæ of the network, which is subdivided into larger segments by coarser diverging fibers from the old connective tissue of the corium, which run without interruption for considerable distances; within these the finer and closer fibers and trabeculæ of the network become visible. The latter increases in density toward the border of the vessel wall and merges with the network of that vessel.

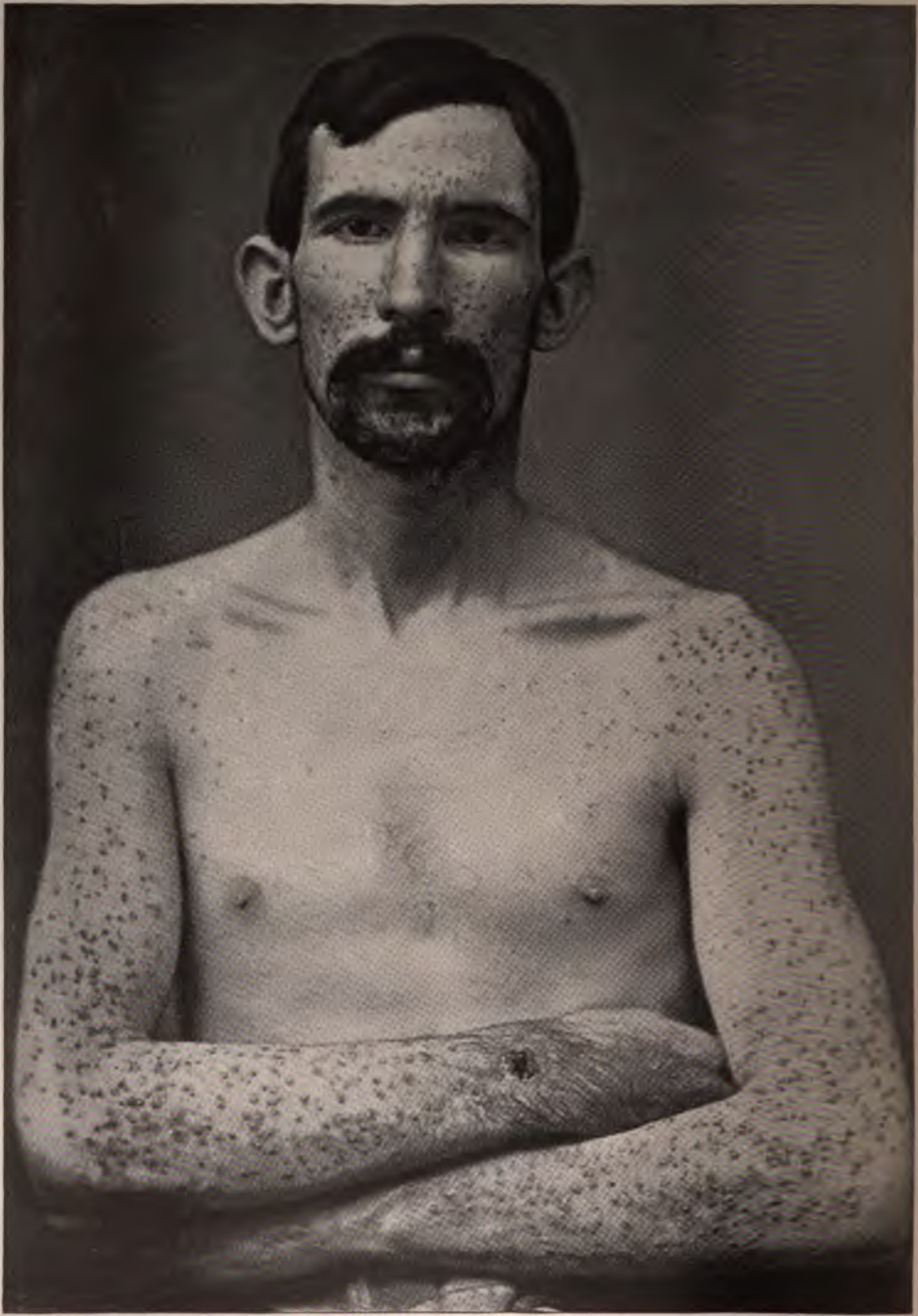
The vessels appear unaltered in their lumen ; their adventitia widened and interspersed with numerous cells and nuclei, which separate into a network; the nuclei of the capillary wall seem enlarged and multiplied.

The cells of the rete Malpighii are striated; many exhibit vacuoles, constricted or double nuclei ; over the disintegrating portions of the papule they appear, where still present, in a state of granular opacity, irregular in outline, and broken down.

Diagnosis.—The restriction of the lesions to certain localities, and the characteristic forms they present, are almost pathognomonic. The differentiation of the moist papule from the initial lesion, the papulo-crustaceous, impeitiginous, and annular forms of syphilide, is of little practical importance.

The lesions with which condylomata lata are most apt to be confounded are the *vegetations* caused by gonorrhœal, chancroidal, and other irritating conditions, but which are not of syphilitic origin. The gross objective characters of the broad and acuminate condylomata are by no means identical, while closer examination will reveal marked differences in their anatomical structure. The fig-shaped papules of syphilis are as broad at their bases as at their summits, while the acuminate vegetations are distinctly pedunculated, with a branched dendritic character of growth. These salient points of difference may, however, be effaced under certain conditions. When the simple papillomatous growths are subjected to pressure from the constant contact of opposing surfaces the acuminate projections may be flattened out, assuming a mushroom

PLATE IX.



Papulo-Pustular Syphilide.

shape, with a comparatively smooth surface, while exceptionally the flat condylomata may assume a decidedly acuminate form. The history of the case, with the presence of concomitant signs of syphilis in other localities, will generally serve to clear up the diagnosis.

THE PUSTULAR SYPHILIDE.

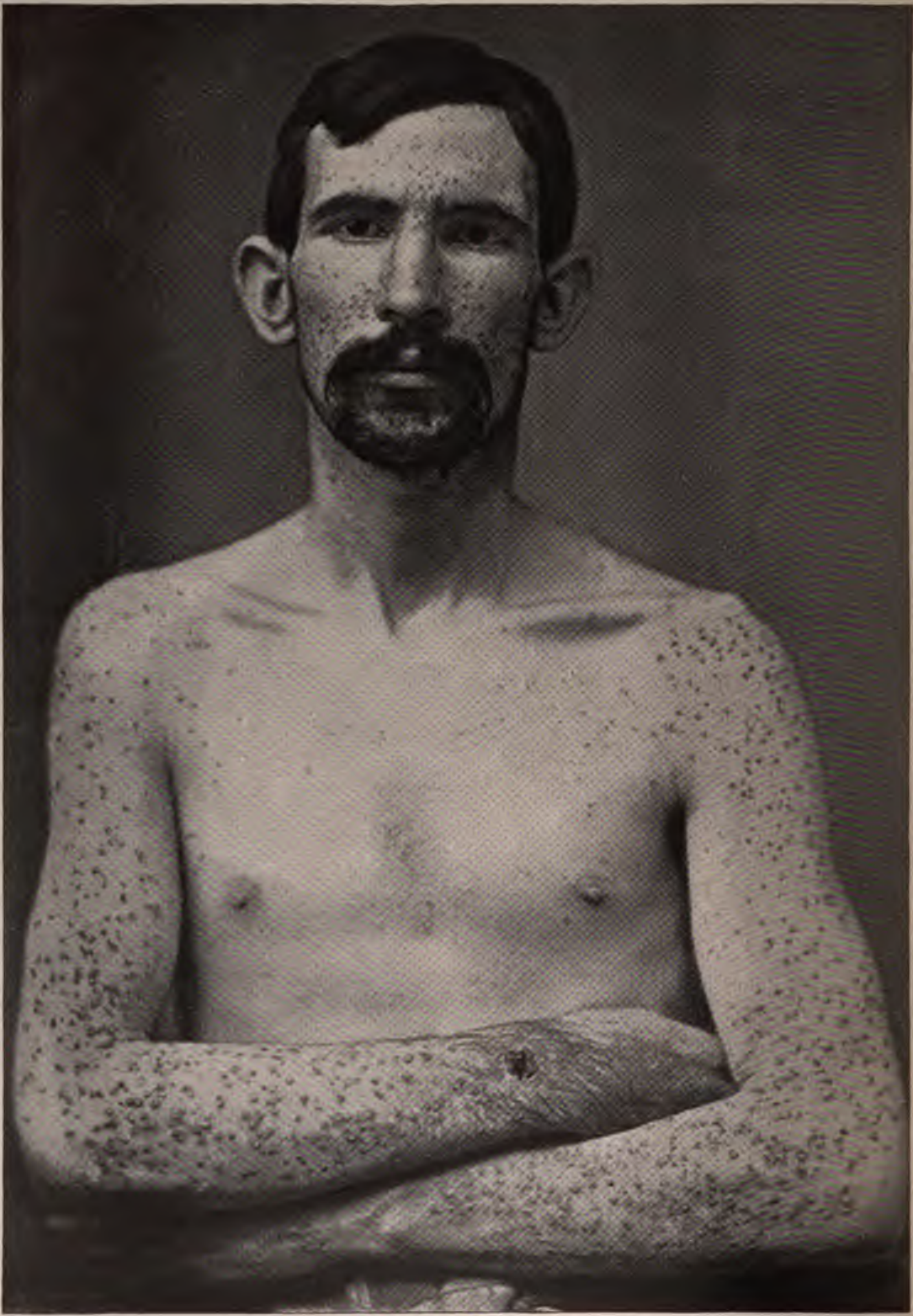
Much confusion has been introduced into syphilography by the numerous divisions and subdivisions of the eruptive forms, and the different names applied to the same lesion in the different phases of its evolution.

Under the general division of pustular syphilides will be classed all those cutaneous lesions of syphilis whose essential and distinguishing feature consists in an elevation of the epidermis by a fluid exudation. By most authorities vesicular syphilides have been described as a separate class; but there is no essential difference between the vesicular and pustular syphilides either in the character of the pathological process or in the subsequent changes they undergo. While certain lesions unquestionably exhibit a distinct vesicular appearance in the early period of their evolution, the vesicular element is, as a rule, exceedingly transitory, and soon undergoes a purulent transformation. The pustule represents the acme or completion of the pathological process, while the vesicle is only a stage in its development, as is exemplified in the mode of evolution of smallpox pustule.

In the *varicella-form syphilide*, for example, which may be taken as the type of the papulo-vesicle, the lesion is primarily papular; a serous or sero-purulent exudation uplifts the epidermis, forming a pinhead to a pea-sized vesicle, which soon assumes a puriform condition. The preliminary vesicular change is often so rapid as to be practically indistinguishable. Similarly in the lesions of the *herpetiform syphilide*, so named from the disposition of papulo-vesicles in a circinate form, resembling herpes circinatus, the serous exudation rapidly becomes puriform. Another variety, described as the *eczematous syphilide*, possesses little clinical importance from its exceeding rarity. Many of the cases so described are doubtless examples of an eczematous eruption which has become impressed with specific characteristics from its development in a syphilitic subject.

All lesions of the pustular type originate from an elementary papular infiltration. They may be acuminate, rounded, or flat. They vary in size, and in the extent and depth of the purulent softening. The purulent metamorphosis may affect only the apex, or involve the papular infiltration in its entirety, and later the structures of the corium in which it is seated. Plate IX represents a papular syphilide undergoing a pustular transformation. Many of the variola-form lesions on the arms present a distinctly visible purulent apex, which feature is less marked in the acne-

PLATE IX.



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The chronological period of the pustular syphilide has wide limits. It may occur as the first manifestation of cutaneous syphilis. Ordinarily the more superficial forms are ranked among the secondary accidents, while the deeper or more destructive forms, as the pustulo-crustaceous and pustulo-ulcerous, develop coincidently with other distinctively tertiary lesions. The essential character of the former is their tendency to terminate by resolution, while the latter are more persistent, extend peripherally, and leave upon healing indelible cicatrices. Deep and generalized pustular lesions are the most frequent expressions of malignant precocious syphilis.

A reference to the older writers would seem to indicate that the comparative frequency of pustular lesions has been materially diminished in recent years, as such accidents formerly occupied a much larger figure in the description of the eruptive forms. This decrease is doubtless due to better stamina, improved modes of living, habits of cleanliness, etc., and diminished exposure to those conditions which act as factors of gravity in syphilis.

While observation shows that the production of pustular lesions is determined largely by the character of the soil, and are incomparably more frequent in the weak, the debilitated, and the cachectic, yet exceptionally they may develop in persons of strong and vigorous constitution. Independent of conditions of the general health, we must recognize the existence of a local predisposition to this type of lesion. The skin of certain individuals exhibits a greater aptitude to the formation of pus. This pyogenic tendency may be awakened into activity by both internal and external causes of irritation, and is equally manifest in common nonspecific disorders of the skin occurring in such individuals.

Reference has already been made to the theory, advanced with some plausibility, that pustulation is not the product of syphilis but the result of local infection. According to this theory the pustular syphilide is a hybrid manifestation involving two essential factors—the action of the syphilitic virus being limited to the cell-infiltration, while the pustular element owes its origin to secondary infection with pyogenic micrococci. Undoubtedly the serpiginous mode of extension of the isolated pustulo-ulcerous lesions of the tertiary stage would seem to conform to this hypothesis of a local infecting process; but the same pathogenetic mode can not with equal propriety be invoked for the earlier pustular eruptions, which are essentially exanthematic in their sudden outbreak and generalization. In this class of cases there would seem to be a morbid spontaneity on the part of the organism to the production of pustular lesions.

The early occurrence of severe pustular lesions always indicates a bad type of syphilis, since it is the expression of a depraved state of the patient's constitution. Jullien has called attention to the fact that voluminous glandular engorgement is a common concomitant of the pustular syphilide. This gloomy prognosis is deepened by the fact that mercurial treatment is much less potent in its influence upon eruptions of the pustular type. Deep ulcerative lesions often prove refractory to specific treatment, while they heal readily under the influence of local antiseptics and stimulants.

ANATOMY.—The anatomical characters of the syphilitic pustule are thus described by Kaposi: There is a sharply limited dense infiltration extending

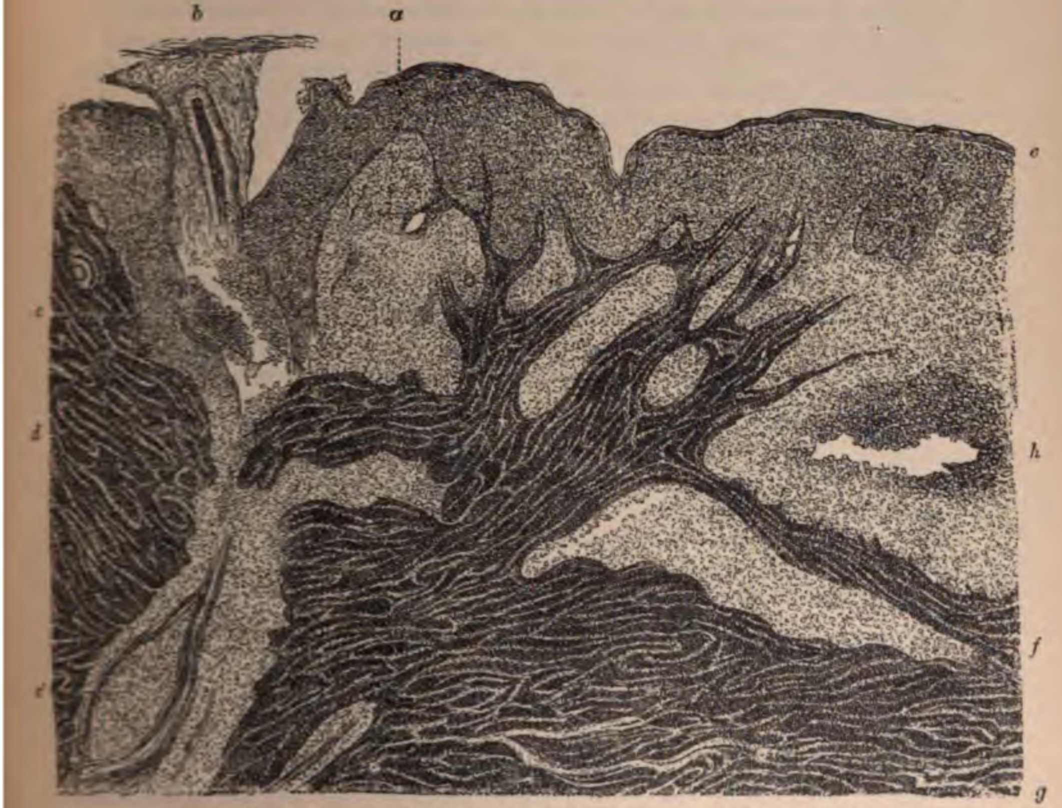


FIG. 4.—Vertical section of acne-form pustule (Hartnack, oc. 3, obj. 5). (Kaposi.)

a, infiltrated papillæ in neighborhood of a hair-follicle; *b*, hair; *c*, *c'*, pus cell-heaps within hair-follicle; *d*, *f*, *g*, normal dermal tissue; *e*, *f*, infiltrated papillæ and corium, in the center of which is a small abscess, *h*.

through the whole papillary body, and with varying depth into the corium, occasionally as far as the subcutaneous cellular tissue; it consists of formed elements which with some degree of regularity, from the older to the more recent portions, progresses either toward absorption or toward purulent disintegration. In the pustular syphilide the two modes of retrogression are combined in such a way as to give the product externally a pustular character.

Only in the most superficial layer of the syphilitic papule is the pus produced which raises the epidermal covering in the shape of a pustule; the purulent disintegration does not progress deeper into its substance even where it enlarges beyond its original boundaries. As in the papular forms (squamous), the greater part of the infiltration is absorbed.

Within the confines of these general anatomical relations two histological variations occur in the pustular syphilide. The one corresponds to the efflorescences of the small and large pustular syphilide; the other to the rupia type. The efflorescences of the two first-named forms, as a rule, include a hair-follicle with its adnexa, the cellular infiltration constituting the papule being deposited in the tissue surrounding the follicle (papillæ and corium). If pus be found in the most superficial strata and in the rete, the pustule will appear not only above but also inside the hair-follicle; cell proliferation and exudation will take place in the region of the external root-sheath, and when excessively developed an intrafollicular abscess will result. A large number of transitional forms, from the small papular to the pustular syphilide, will be found.

In the larger forms of pustule leading to the development of rupia the histological conditions are still simpler. The cellular infiltration affects a larger territory, that, as a rule, extends no deeper than the median layer of the corium. The most essential feature is the occurrence of distinctly outlined, very granular, opacified, nucleated (pus) cells, and free nuclei within the uppermost stratum of the corium and papillary layer and in the rete, inclosed in a succulent, œdematous, large-meshed tissue, or even in free spaces, above which the epidermis bulges (as the cover of the pustule). This condition corresponds to the acme of the process for every single point of the diseased patch, varying, however, according to the age of the local disease. In any case, it corresponds first to the center of the patch, and in the course of time progresses toward its periphery. At the involved points is observed an atrophied papillary body, or else the thinned corium runs in a straight line, covered with a thin pigmented or nonpigmented mucous layer.

In vertical sections the portion of the infiltrated spot which is in a state of purulent disintegration, appears sharply demarcated externally, limited by the peripheral portion of the infiltrated tissues (papillæ).

The Varicella-form Syphilide.—This eruptive form results from the transformation of lesions primary papular into papulo-vesicles and papulo-pustules from the intensity of the inflammatory process. The lesions do not necessarily have a follicular origin, since they may be found in localities where sebaceous glands do not exist, as the palms and soles. They show a preference for the forehead, sides of the trunk, and flexor surfaces, where the skin is fine and delicate.

The lesions begin as small, dull-red, infiltrated spots, the epidermis over which becomes elevated by the effusion of a serous or sero-purulent fluid. The lesions are at first convex, from the size of a lentil to that of a pea, and surrounded by a well-defined coppery areola. In the course of a few days they become flattened or depressed in the center, from the partial absorption of the fluid contents. The epidermal covering gradually shrinks, and with the dried contents forms a thick, adherent crust of a brownish or greenish-black color. The fall of the crusts leaves brownish-red or stained depressions, which persist for some time.

The eruption, which is frequently one of the first of the secondary manifestations, usually lasts from three to six weeks, but its entire period may be prolonged to several months by the successive development of new crops. While the lesions are usually discrete and scattered, they may exceptionally become confluent. Zeissl has described this form, under the title of *varicella syphilitica adultorum disseminata*, which is chiefly remarkable for its rarity.

A modification of this eruptive form has been described as the *variola-form syphilide*, which is distinguished by the hard, shotty, umbilicated character of the lesions, which are identical in objective characters with those of smallpox. Liveing, Hutchinson, and others have reported cases in which the differential diagnosis was in the first instance impossible. Hutchinson says: "The simulation of the variolous eruption by syphilis is the most marked example of 'syphilitic imitation.' The papules are elevated, shotty to the finger, have depressed centers, affect the same regions as variola, and resemble it so absolutely that nothing but the history of the case can help the surgeon to a correct opinion."

Elsewhere I have reported (On the Diagnosis of Smallpox, Journ. Cutan. and Ven. Dis., March, 1886) numerous cases taken from the records of the New York Board of Health, where syphilis has been mistaken for smallpox, and the patients have been sent to the smallpox hospitals for suspected variola.

Diagnosis.—This syphilide derives an added clinical importance from the objective identity of its lesions with those of varicella and varioloid; the resemblance is heightened by the frequent concomitance of more or less marked febrile disturbance.

From *varicella* it may ordinarily be distinguished by the slow evolution of the efflorescence, the less pronounced character of the initiatory fever, and the absence of the redness, heat, and other signs of inflammatory disturbance of the skin. In syphilis the skin is pale and muddy, the lesions are less tense and full, slower in development and longer in duration; in varicella the eruption comes up more promptly and the transitional changes are more rapid. A cardinal point of distinction is that varicella is essentially a disease of childhood, while syphilis is commonly found in adult life.

The similitude of syphilis to *variola* is sometimes so accurate as to deceive even the most experienced physician. There is not only identity of anatomical forms, but also of evolution through the stages of papule, vesicle, and pustule. The simulation is heightened by the fact that in but the crusts are very persistent. If detached, they rapidly form again, and often remain adherent until the reparative process is complete. In Plate X there are seen impetigo-form lesions on the brow, face, and chest. Some of the larger lesions on the arms and legs are ecthyma-form in character.

When resolution takes place the crusts rapidly fall off, leaving a violaceous or coppery-red pigmentation, which gradually pales into a whitish hue. Not infrequently there remain permanent traces in the shape of superficial cicatrices.

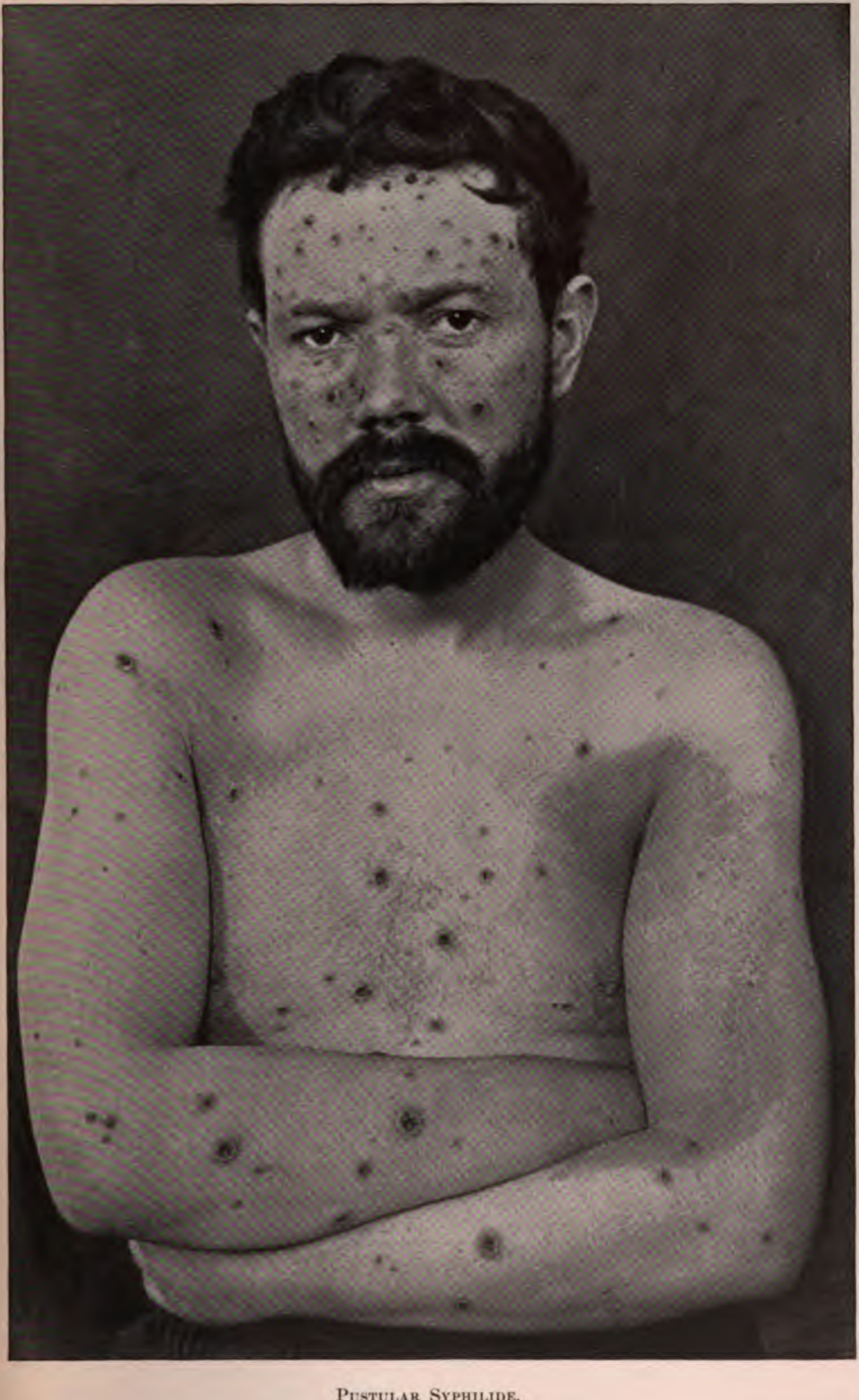
Another mode of development is by the confluence of a number of small pustules, grouped upon an erythematous base and surrounded by a distinctly defined areola. The crusts may become heaped up, forming thick concretions of a yellowish-green color, covering a granular, eroded surface.

The lesions of the *confluent impetiginous syphilide* may attain considerable dimensions by the development of new pustules at the periphery, presenting the appearance of an annular elevation around the crust. This purulent ring is soon converted into a circular crust, and the central lesion continues to enlarge by the development of these concentric zones of ulceration. Instead of this circular mode of extension the lesion may heal at one side while new foci of ulceration form at the other, giving it a reniform or serpiginous shape. By the fusion of contiguous serpiginous lesions the ulcerative process may involve extensive surfaces, sometimes covering half the face or one side of the scalp.

In the variety known as *impetigo rodens* the ulcerative process, instead of being limited to the superficial layers, involves the entire thickness of the skin. The removal of the crust reveals an ulceration with abrupt edges and a pultaceous floor, strikingly suggestive of the appearance of soft chancre. The secretion is, however, more concrescible, and rapidly dries into a crust. In deep destructive action this form presents a great similarity to the ulcero-crustaceous lesions which characterize the tertiary stage of syphilis. It is more frequently found in the strumous and cachectic, and its early occurrence indicates a grave type of syphilis.

The benign form of impetigo, characterized by superficial discrete lesions, has a predilection for the face, especially the hairy portions around the lips and sides of the face, the naso-labial furrows, and the genitals. The confluent form is also most characteristically developed upon the hairy scalp and the genitals. It sometimes occurs on the extensor surfaces of the limbs, more rarely upon the abdomen and back. It causes considerable disfigurement, and when involving the scalp and beard it may destroy the hair-follicles, and thus produce permanent alopecia. In Plate XI, representing a pustulo-crustaceous syphilide, the impetiginous crusts

PLATE X.



Pustular Syphilide.

are massed about the eyebrows along the naso-jugal and naso-labial furrows, the upper lip and chin, with superficial ecthymatous lesions on the trunk and extremities.

The chronological period of the milder form of the impetiginous syphilide is confined to the secondary stage. The deeper destructive variety, except when occurring as a precocious manifestation of malignant syphilis, is essentially a late manifestation.

Diagnosis.—The impetigo-form syphilide may be mistaken for *impetigo vulgaris*, the objective characters of the lesions being almost identical in certain cases. In impetigo vulgaris the invasion of the eruption is more acute, and attended by more or less heat and itching of the skin; the course of the lesions through the various stages of pustulation, concretion, and decrustation is much more rapid, and the inflammatory areola disappears when the crust forms. The crusts are lighter in color, more dense, more brittle, and intimately adherent to their bases. The lesions of syphilis are more indolent in their evolution, the crusts are darker, more porous, more easily lifted up, and the areola persists after their formation. The presence or history of other signs of syphilis is usually found.

From *sycosis* impetigo syphilitica may be differentiated by the objective characters alone. In sycosis the suppurative process is deeper, more furuncular in character, and attended with more or less brawny infiltration of the skin. In syphilis the process is more superficial; the hairs fall out and do not grow again; there is often a coincident development of pustular lesions on the hairy scalp and elsewhere. In sycosis the disease is limited to the hairy portions of the face, and does not extend to the scalp. It is not followed by permanent alopecia.

From *impetiginous eczema* the confluent impetiginous syphilide may be distinguished by the more sharply defined periphery of the lesions, the character of the crusts, and the absence of subjective symptoms. In eczema the discharge is thinner, forming yellowish, flaky scales, and is attended with intense subjective sensations.

The Ecthyma-form Syphilide.—This eruptive form is also designated as the large pustular syphilide; according to the extent and depth of the ulcerative process and the rapidity of its extension, it has been divided into two varieties, the superficial and the deep.

Superficial ecthyma constitutes one of the late secondary manifestations, and does not differ essentially from the impetigo-form syphilide, except in its seat of predilection and the larger size of the pustules; while situated habitually upon the lower extremities, it may have a more extensive distribution upon the side and back of the neck, inguinal and gluteal regions, and exceptionally upon the trunk.

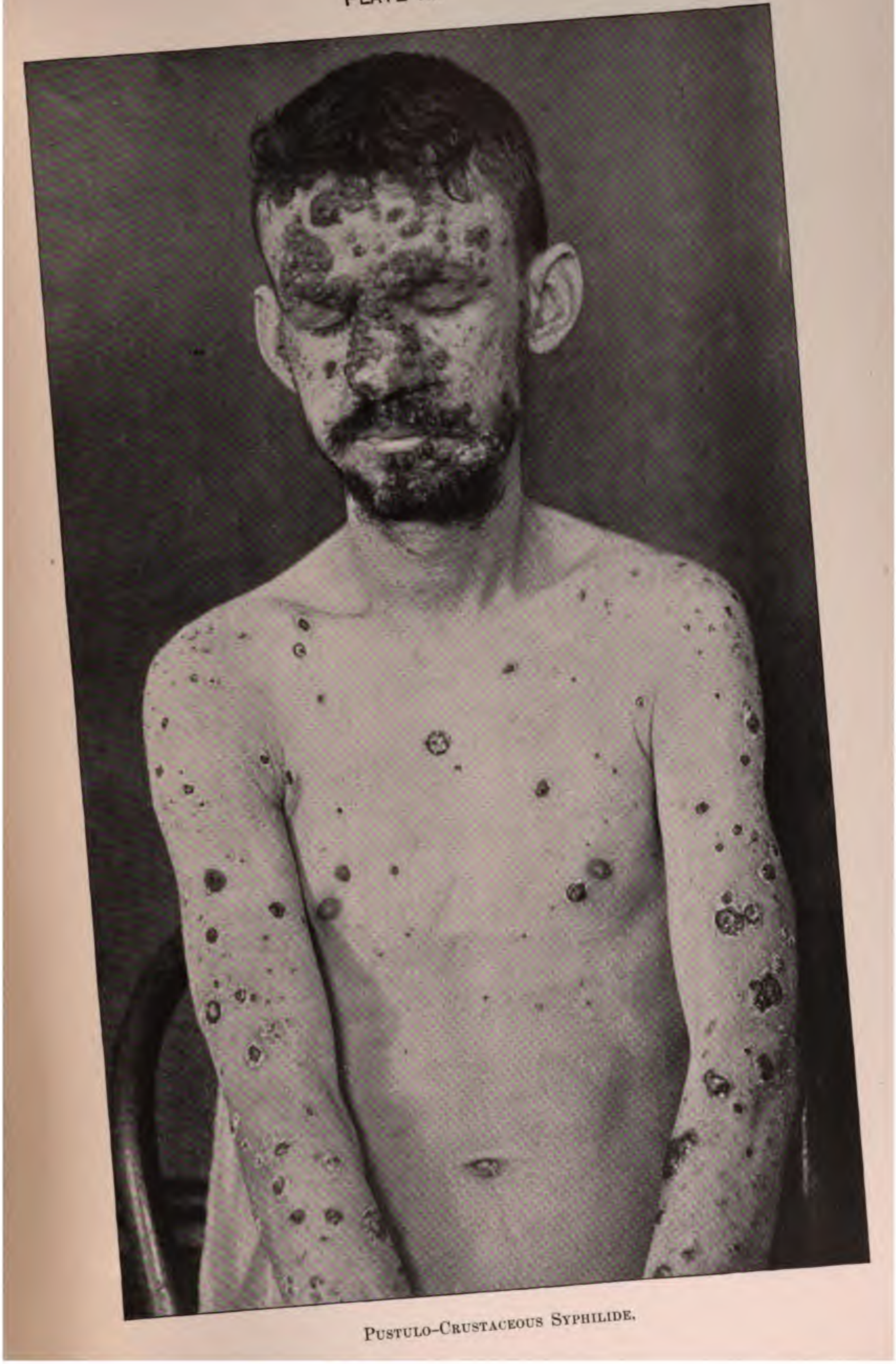
The *deep ecthyma-form syphilide* is usually a late manifestation, except in malignant syphilis, when it appears precociously. In the extent and depth of its destructive action it is the most formidable of the pustular group. Its development appears to depend largely upon the character of the soil, as it is incomparably more common in the cachectic. It is not limited to the lower extremities, its habitual seat, but may be found upon the shoulders, the arms, and elsewhere.

In the *superficial variety* the pustules develop upon a reddened base, the periphery of which becomes infiltrated, forming a red zone. The contents of the pustule consist of a turbid puriform exudation often mixed with blood. After a few days the covering of the pustule collapses in the center and the contents desiccate in the form of a thin, blackish-brown crust, beneath which ulceration takes place; in this variety the erosion involves only the upper layers of the skin. In the course of its involution granulations form at the base and the crust is gradually detached, leaving a papular eroded elevation, upon which a crust may reform a number of times before the reparative process is complete. The coppery, pigmented areola which surrounds the spots remains for a long while.

In the *deep variety* the primary infiltration is more marked and often papular in character, the ulceration is more profound and extensive, the crusts are thicker, the areola is of a vinous red, and the resorption of the neoplasm is followed by an indelible cicatrix. When the crust of a deep ecthymatous ulcer is removed there is revealed a punched-out or excavated ulceration, with a grayish, dark-brown, or livid, sometimes gangrenous floor, covered with a tenacious mass of molecular detritus, the cavity secreting a purulent fluid mixed with blood, which rapidly concretes into the reformation of a greenish-black crust. The ulceration often extends beyond the margins of the crust, which is soon surrounded by a purulent furrow or ring. This condition is produced, according to Mauriac, as follows: "The borders of the ulceration in their centrifugal course surpass those of the crust, which, without being detached, becomes mobile, and seems to float upon the ichorous pus superabundantly secreted beneath it."

The reparative process, which is usually sluggish and protracted, is marked by a thinning of the secretion, the thickened borders become effaced, the floor clears up and becomes covered with healthy granulations. It is not rare for the crustaceous element to persist until the complete healing of the ulcer. The red, depressed scars are for a long time surrounded by a coppery areola, and gradually fade into a smooth, dead-white color. Ecthymatous cicatrices are peculiar and characteristic, giving a clear imprint of the character and extent of the ulcerative process which has caused them. When the lesions are discrete they are circular in contour; when extensive surfaces have been involved by the confluence of ulcerations of uneven depth, causing in some places partial and in others complete destruction of the skin, they present the appearance of

PLATE XI.



Pustulo-Crustaceous Syphilide.

patches of more or less normal skin, with remains of its follicular structure, relieved here and there by perfectly white, depressed cicatrices where the ulcerative process has penetrated deeply and destroyed the skin in its entire thickness.

The chronological period of the deep ecthymatous syphilide is the intermediate and tertiary stages. Its course is always chronic. Not infrequently, by the confluence of lesions of this type, vast surfaces of ulceration are formed, accompanied by fever of a hectic character and other severe systemic symptoms.

ANATOMY.—The histology of the deep ecthymatous pustule has been studied with great care by Cornil. Fig. 5 represents the edge and a portion of the surface of one of these pustules magnified twenty diameters; the epidermic crust covering the pustules is absent from *m* to *m'*, but from *m* to *t*, in all the portion *e*, *e*, it is in place, and is continuous at *t* with the healthy skin. At the edge of the pustule, in the region included between *d* and *t*, the epidermic layers are in place and are infiltrated with pus; the layer *n*, which appears under a less power as a network with fine meshes, belongs to the corneus stratum; the layer *d* represents the rete mucosum.

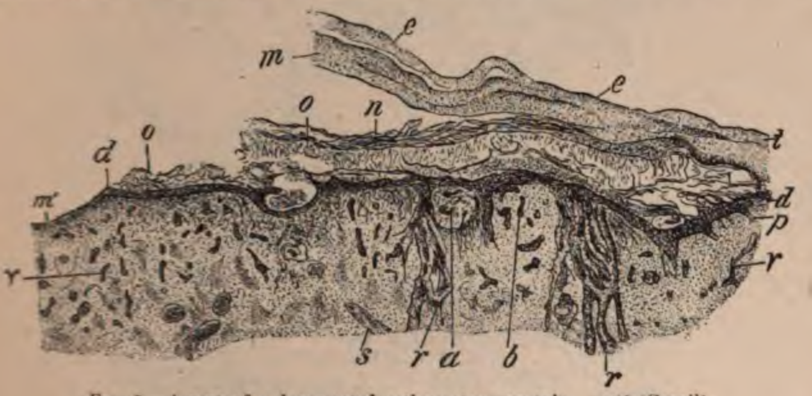


Fig. 5.—A part of a deep-seated ecthymatous pustule. × 20 (Cornil).

e, *e*, superficial epidermis corresponding to the scab of the pustule. This layer has fallen off at *m*; it is continuous at *t* with the normal epidermis; *n*, a portion of the corneous epidermis infiltrated with pus-corpuscles; *o*, cavities filled with pus; *d*, rete mucosum; *a*, *b*, papillæ; *p*, papillæ placed between the normal and changed papillæ; *r*, *r*, prolongation of the rete mucosum belonging to the hair-follicles and sebaceous glands; *m'*, ulcerated part forming a flat surface and covered with a thin layer of flat cells; *v*, *v*, dilated vessels; *s*, fasciculi of smooth muscular fibers.

Passing from the edge of the pustule toward its center, the cells belonging to the rete mucosum form a thin stratum, *m*, and then disappear, leaving the papillæ uncovered and suppurating. The papillary layer is easily discernible, and the papillæ *a* and *b* are larger than in health. Near the margins of the pustule, but nearer the center, they have run together; their extremities are no longer distinguished, and they form a uniform layer, from the free surface of which extend the lymph-cells with which they are filled. In the figure, *r*, *r*, represent the epidermic prolongations which surround the hair-follicles and penetrate the acini of the sebaceous glands; the blood-vessels *v*, *v*, are much dilated and congested.

The changes undergone by the epidermis in the region included, *n* and *d*, which is the Malpighian layer devoid of crusts, are reproduced, magnified two hundred and fifty diameters, in Fig. 6.

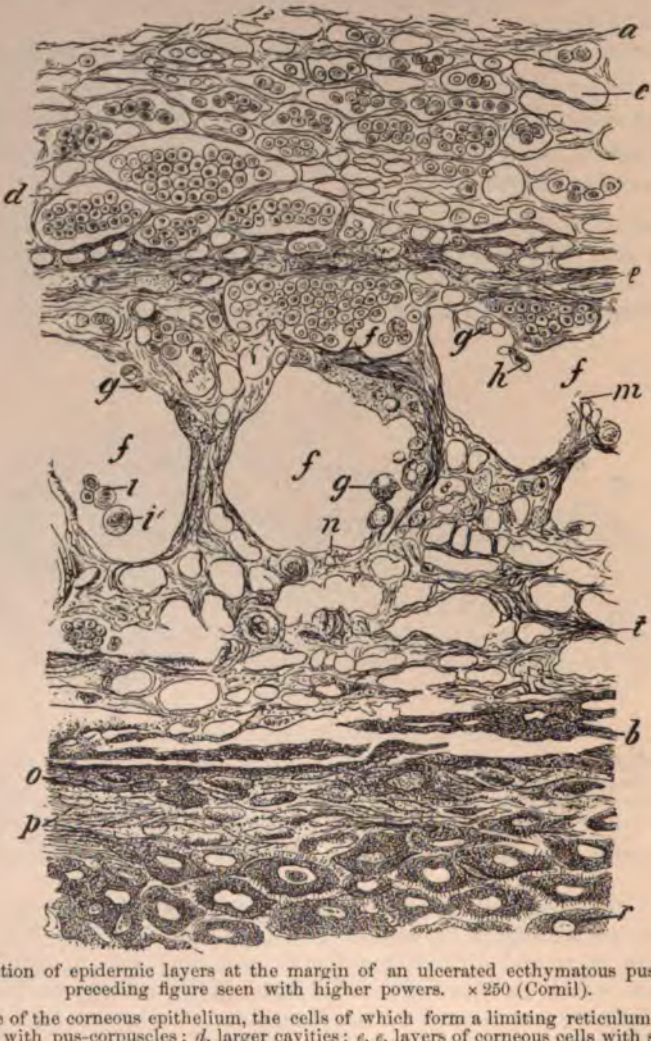
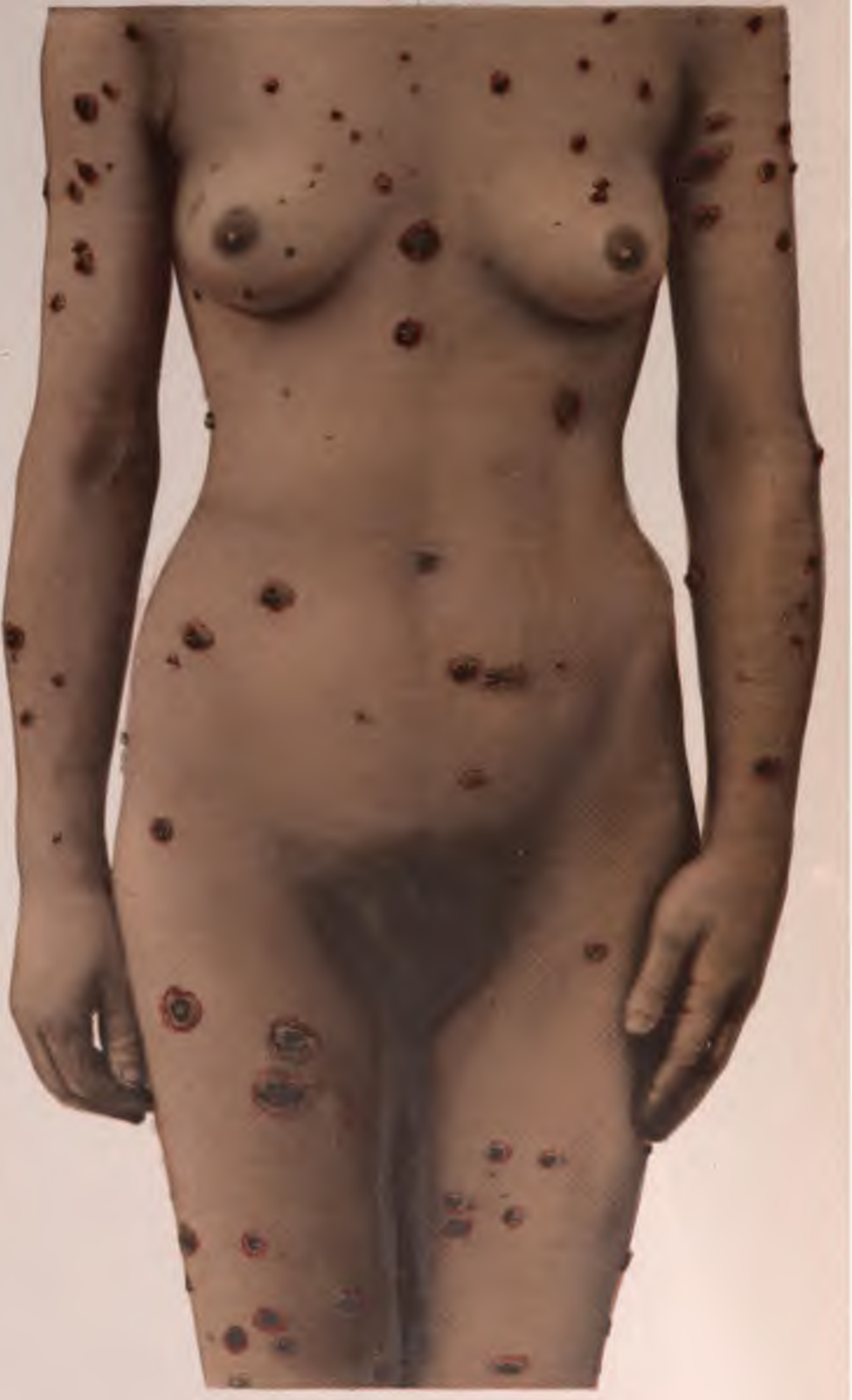


FIG. 6.—Section of epidermic layers at the margin of an ulcerated ecthymatous pustule, part of preceding figure seen with higher powers. × 250 (Cornil).

a, surface of the corneous epithelium, the cells of which form a limiting reticulum of the cavities, *e*, filled with pus-corpuscles; *d*, larger cavities; *e*, *e*, layers of corneous cells with smaller cavities; *f*, *f*, *f*, large cavities having lost their pus-corpuscles; *f'*, one of these large cavities containing pus-corpuscles; *h*, free cells; *g*, *g*, free cells excavated by a cavity; *g'*, one of these cells excavated and crenated; *i*, a free cell containing two nuclei; *i'*, a free cell containing blood-corpuscles; *m*, excavated cell forming a part of the partition of a large cavity; *t*, layers of corneous cells more or less excavated with cavities; *b*, layers of cells with indentations. The rete mucosum extends from *b* to *r*. *o*, cells of the granular layer; *p*, one of these cells excavated with an oval cavity, the nucleus of which has disappeared.

In the first layer are found cavities filled with pus-cells, the thin walls of which are made up of flattened corneous cells. These cavities are of variable size, and have their long diameter parallel to the surface of the skin. The smaller cavities of the subjacent layer *e* are cavities in epidermic cells. Below

PLATE XII.



RUPIAL SYPHILIDE.

this layer is found a zone of large cavities, *f f f*, which were originally filled with free pus-cells, their walls found by easily demonstrable corneous cells, some of which are detached and appear in profile, as at *h*, or in full view, as at *g*, and the latter often contain a small, empty cavity and have crenated or indented edges. These walls often show notches, as at *f′*, and irregular branching processes, as is the case in all suppurations occurring amid epidermic cells.

There are also found, besides lymph and pus-cells of the usual dimensions, some large cells containing two nuclei, *i*, or many nuclei, and even some cells containing red blood-corpuscles, *i′*. In the layer *t* are seen ramifying cells excavated with small cavities containing pus ; larger cavities are also observed. Finally comes the layer of large spinous cells, either separated or united together. The granular structure presents a certain regularity, and the nuclei of the cells are sometimes preserved, as at *o*, and sometimes absent, and the cells excavated with a cavity, as at *p*. The spinous cells of the rete mucosum *r* are larger, and almost invariably have a cavity around the nucleus, which latter is often atrophied, replaced by granules, or absent. A part of a papilla may be seen at *s*.

Diagnosis.—This syphilide may be confounded with *ecthyma vulgaris*. The lesions of the latter are, however, more furuncular in character, more painful, not surrounded by a coppery areola, and the suppuration is more superficial, with less tendency to form crusts. Varicose ulcers of the leg have also been mistaken for syphilitic ecthymatous ulcers. A recourse to specific treatment may be necessary to establish the differential diagnosis.

The Rupial Syphilide.—This is one of the most typical lesions of syphilis ; indeed, the presence of characteristic rupial crusts may be regarded as pathognomonic (Plate XII).

The elementary lesion may be a flat pustule, or a bulla filled with a serous or blood-stained fluid, which rapidly becomes turbid and purulent, and is surrounded by a livid inflammatory areola. The epidermal covering ruptures, and the contents dry into brownish or greenish-black crusts, under which ulceration takes place. The initial crust represents the size of the original lesion, but as the ulceration extends at the periphery the crust becomes thickened by the addition of successive layers from beneath, each new layer giving it a broader base, while increasing its height, until finally the primitive coagulum forms the apex of a cone-like crust, made up of stratified layers, which may be one, two, or three inches in diameter. Sometimes the ulcerative process extends more rapidly at one segment of the ulcer, the lesion assuming a reniform shape, the grayish or blackish-brown crusts rough and furrowed upon the surface, giving them the appearance of limpet or oyster shells. Not infrequently the ulceration creeps along in a serpiginous course.

If the crust is forcibly removed, there is revealed an indolent-looking ulcer, with abrupt, undermined edges, secreting a serous pus mixed with blood.

The reparative process is announced by the fall of the crust; the base of the ulcer becomes covered with healthy granulations, which become converted into cicatricial tissue. The cicatrices of rupia are smooth, white, shining, and often reticulated. The course of a rupial eruption is usually protracted, lasting two or three months, but it may be prolonged for several months, by the development of new crops.

Rupia is usually ranked as a late secondary accident. In strumous, cachectic, or debilitated subjects it may develop much earlier, within the first few months, when its outbreak is usually preceded by febrile disturbance.

Rupia may occur as a generalized eruption; it is more common on the face, neck, and extremities. The number of the lesions is usually in inverse proportion to their size; the ulceration is comparatively superficial, irrespective of their dimensions. The conical stratified crusts of rupia are so characteristic and typical that they are not likely to be confounded with the lesions of any other disease.

Pustulo-Ulcerous Syphilides.—From the foregoing description it will appear that the group of pustulo-crustaceous syphilides represented by *impetigo rodens*, *deep ecthyma*, and *rupia* have many points of resemblance. They are similar in their anatomical formation, the pathological process involving the deep layers of the skin and leaving permanent scars. They are identical in their mode of evolution, all pass-

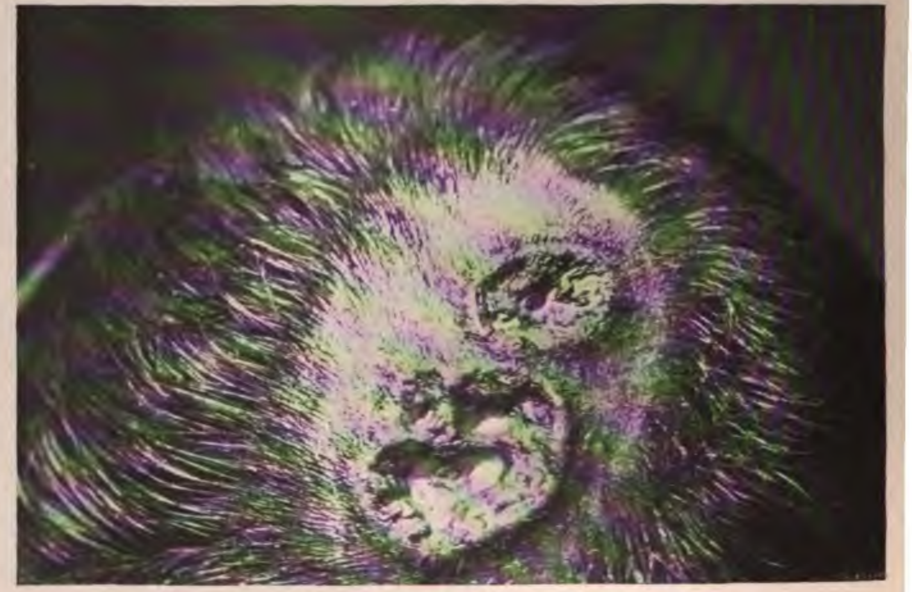


FIG. 7.—Impetigo rodens of scalp.

ing through the stages of infiltration, pustulation, suppuration, and reparation. Ulceration is their distinctive and most characteristic feature; it may be complicated with phagedena or assume a serpiginous mode of extension.

They differ somewhat in their primary stage, their distribution, the depth of the ulcerative process, and the character of the crusts.

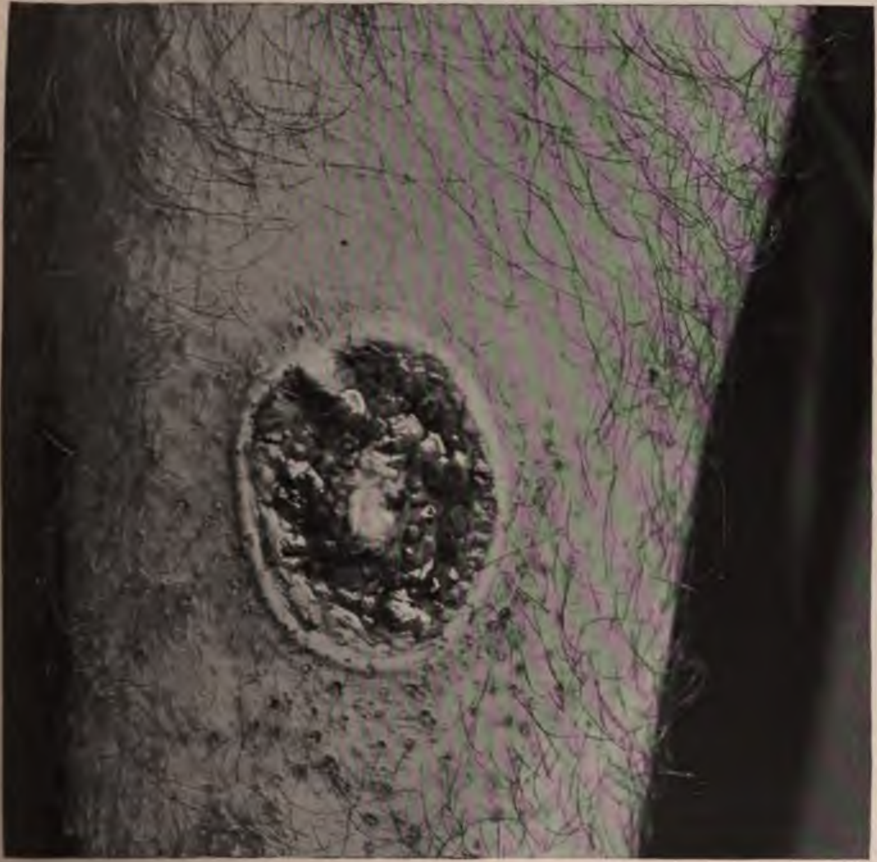


FIG. 8.—Ecthymatous ulcer of leg.

Impetigo rodens originates from a small pustule or a number of small pustules massed together; it has a preference for the face and hairy scalp. Lesions of impetigo rodens upon the scalp are represented in Fig. 7.

Deep ecthyma has for its elementary lesion a large pustule; its deep, destructive tendency constitutes its distinguishing characteristic; it is found chiefly on the lower extremities, though not limited to these regions. In Fig. 8 is shown a deep ecthymatous ulcer of the leg, from which the crust has been removed. In the center cicatrization has begun, while the ulcerative process continues to extend at the periphery.

Rupia originates from a flat, sero-purulent bulla, or a pustule surrounded by a serous exudation. The basic infiltration is not so elevated or pronounced as in ecthyma; the ulceration is more superficial, its secretion is more often mixed with blood, imparting a greenish-black color to the crusts, which are distinctly laminated and conoid in shape.

Rupia has a more extensive distribution than ecthyma, often presenting the generalized character of an exanthem. It is more rarely found as a concomitant of other eruptive forms, while it is not unusual to see an eruption distinctly papular upon the trunk and upper extremities associated with ecthymatous lesions of the lower extremities.

Finally, it may be said that this group of pustulo-ulcerous lesions occur at about the same stage of the disease, and have the same clinical significance; they always indicate a bad type of syphilis. They may be regarded as accidents of the intermediate period which marks the transition from the secondary to the tertiary stage. By many authorities the *resolutive pustular syphilides* are regarded as secondary accidents, while the *ulcerative pustular syphilides* are classed as tertiary phenomena. The latter have certain characteristics in common with tertiary lesions; they are circumscribed, nonsymmetrical, and destructive, always leaving permanent scars. On the other hand, their generating elements, or the primitive lesions from which they originate, are of a superficial character.

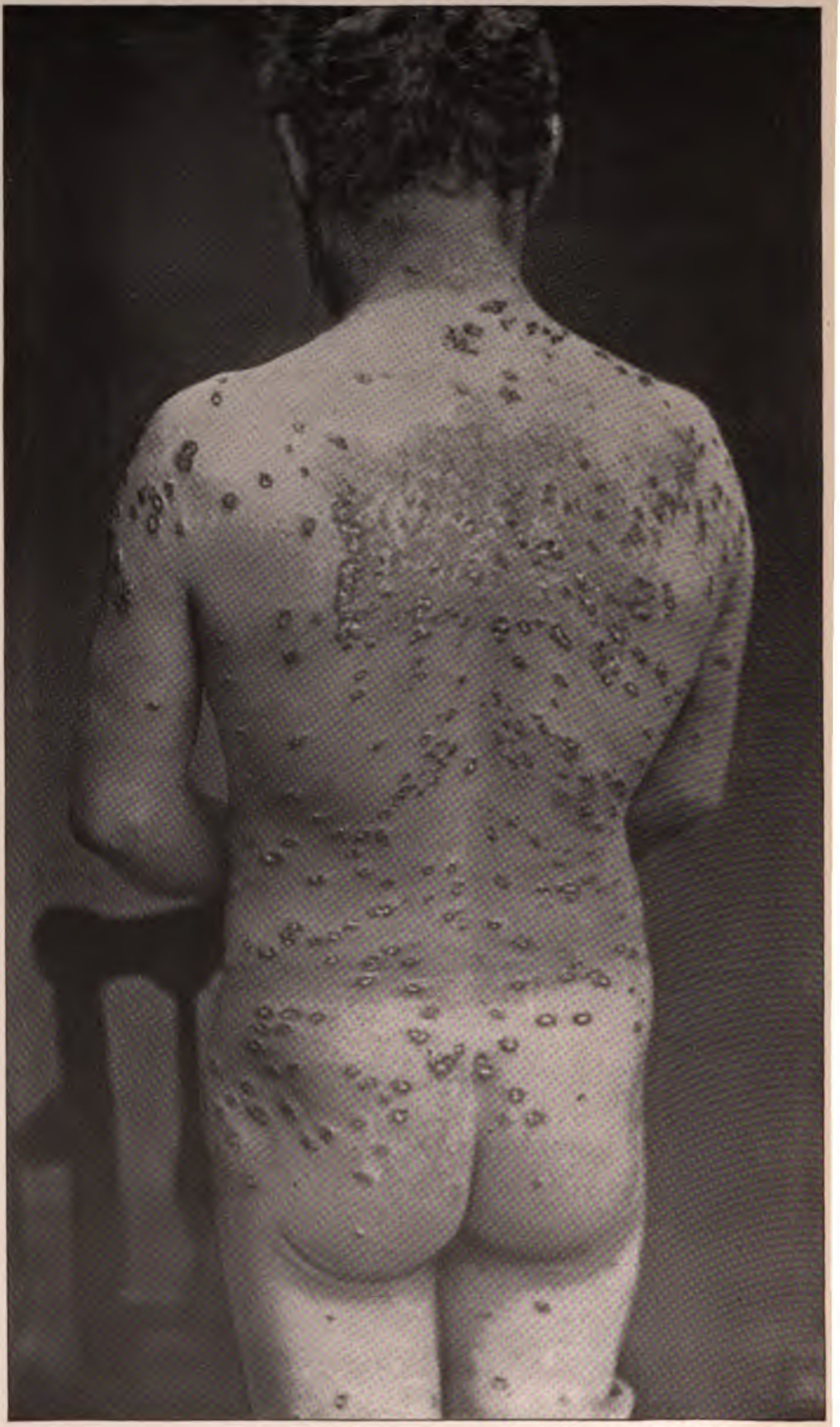
THE TUBERCULAR SYPHILIDE.

In the classification of the syphilides based upon the anatomical form and character of the syphilitic process, the tubercle and gumma are recognized as the essential lesions of the tertiary stage. They constitute the latest and deepest of the cutaneous lesions of syphilis.

Between the tubercle and gumma there are numerous and striking analogies; they possess identical histological characters, differing only in the size and depth of the cellular infiltration, the chief distinction being that the tubercle is an intradermic lesion, while the gumma extends into the subcutaneous tissues. The tubercle may be described as a gumma of the skin, and conversely, the gumma as a deep tubercle of the connective tissue.

As a rule they develop from three to four years after the chancre, sometimes not before the tenth, fifteenth, or twentieth year after infection. Exceptionally they may occur much earlier, during the first year, or even within the first few months. Their precocious development always marks a grave or anomalous type of syphilis.

While they may develop upon any portion of the body or mucous surfaces, they are usually limited in number, with a predilection for the



Disseminate Tubercular Syphilide.

face, back of shoulders, arms, thighs, and legs. They are essentially chronic in their course, and may disappear either by resorption or by a process of softening and ulceration.

The Tubercular Syphilide.—The tubercle may be defined as a circumscribed solid infiltration of the skin, which does not extend into the subcutaneous tissue. The lesions consist of small, rounded tumors, of a brownish-red or coppery color, varying in size from a small pea to that of a bean, firm and dense to the feel. As they grow older they become paler in color. Upon the lower extremities the nodules assume a violaceous hue. The lesions may be generalized, as in Plate XIII, or they may be isolated or occur in groups (Plate XIV), and form by their confluence large masses of infiltration, although the component tubercles are discernible especially on the borders of the patch. The eruptive elements may be grouped in the form of a ring, a horseshoe, or in concentric circles, and as they disappear by resolution or suppuration new lesions may spring up at the periphery, resulting in variously sized and shaped configurations.

Clinically the tubercular syphilide presents so many analogies with the late papular syphilide that it is sometimes difficult to draw clear lines of demarcation between them. This is not surprising, in view of their close histological relationship. The papular syphilide is essentially resolutive; while the tendency of the tubercular deposit is to break down and become ulcerative, although, like the papule, it may disappear by interstitial absorption.

The tubercular syphilide may appear upon any portion of the integument. Its seat of predilection is the face, especially about the alæ of the nose, the forehead, the ears, the back of the neck and shoulders, and the inferior extremities; about the nose and neighboring parts the lesions have a special tendency to become aggregated. When developed upon the brow and along the hairy scalp they constitute one of the varieties of the so-called *corona veneris*.

The course of the tubercular syphilide is essentially chronic. The individual lesions are persistent and the retrogressive changes excessively slow; so that, with the development of new tubercles and the sluggish involution of the old ones, its duration may be prolonged for months or years.

The lesions of the tubercular syphilide may be divided into two distinct categories, the dry and the ulcerative, according to the changes which they undergo in the process of involution. In the former, resorption occurs without ulceration; in the latter, the cellular elements break down and are eliminated by the ulcerative process. In both there is more or less destruction of the connective tissue of the derma into which the embryonic cells have infiltrated, with the formation of cicatricial tissue.

The Dry or Atrophic Tubercular Syphilide.—This variety presents many analogies with the large papular syphilide. It occurs comparatively early, from the third to the sixth year, and the lesions may be disseminated and comparatively numerous; their number is often in inverse proportion to their size. In the later periods the tubercles are fewer in number, more voluminous, and more apt to occur in groups.

The face is a favorite location for this form of syphilide, the tubercles being numerous and prominent especially over the forehead, and forming by their confluence a diffuse nodular infiltration which, with the accompanying thickness of the skin, gives rise to the peculiar appearance which has been characterized as syphilitic *leontiasis*. In some cases the integument becomes enormously hypertrophied, separated by transverse folds or rugæ, forming prominent bosses, and presenting an appearance strikingly suggestive of leprosy.

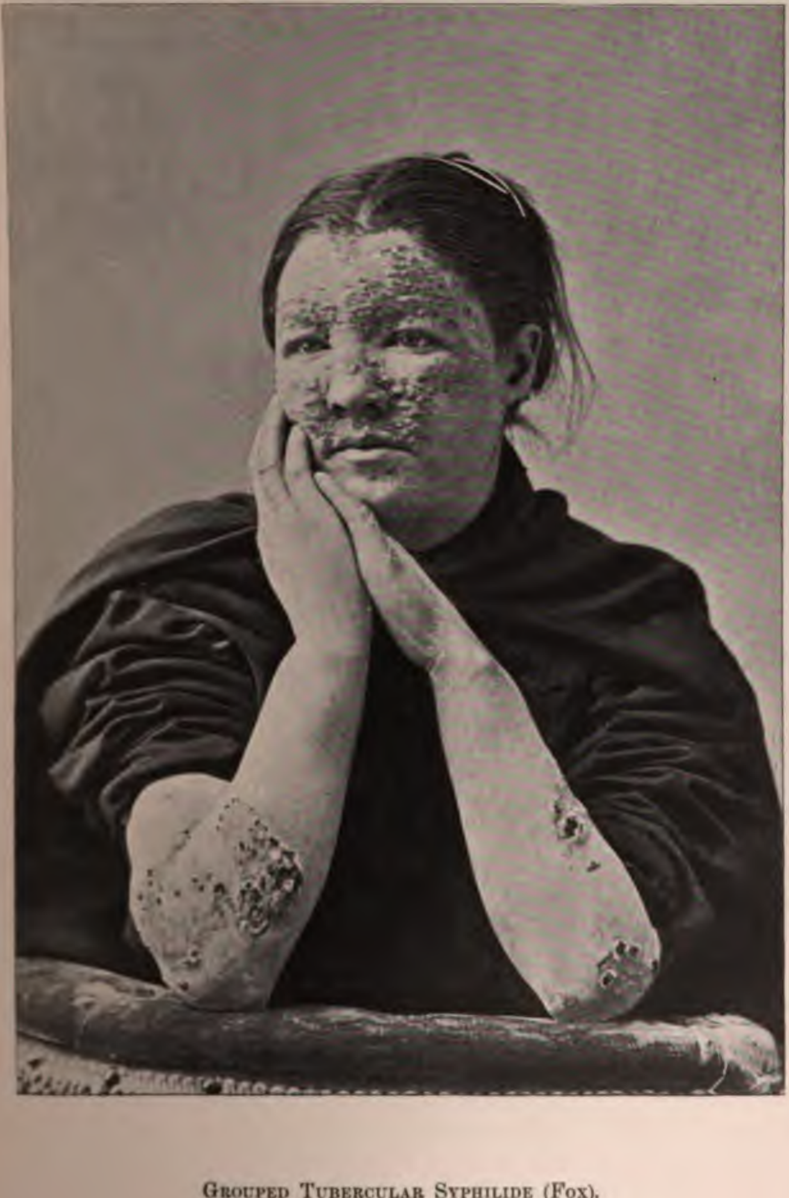
In the majority of cases the eruption is circumscribed, and grouped with a circular or crescentic configuration which extends by the development of new tubercles at the periphery.

Upon the palmar and plantar surfaces they have a tendency to slight scaliness, constituting one of the varieties of palmar or plantar psoriasis. In this locality they are circularly disposed, with a scalloped configuration of the outer borders, surrounded by a coppery areola; the outlying tubercles, which form the periphery, are easily distinguishable.

In this variety the lesions undergo resolution through degeneration of the cellular elements, with atrophy of the dermal tissue—the cicatricial transformation taking place beneath an intact or simply inflamed skin, without the intervention of the ulcerative process. In the course of their involution the rounded nodules become flattened, less firm to the feel, and are finally effaced. The brownish-red coloration of the skin gradually pales into a grayish pigmented spot, which finally fades into a whitish cicatricial depression. When a group of tubercles undergoes the retrograde metamorphosis the older nodules first disappear, resulting in a cicatricial center, which gradually enlarges by the involution of the more recent tubercles developed in the periphery of the patch, the eruption often migrating over considerable surfaces. In this manner are produced the circular and variously shaped cicatrices characteristic of this syphilide.

The Ulcerative Tubercular Syphilide.—Softening, ulceration, and the formation of scabs or crusts, constitute the distinctive features of this variety. In the formative stage the ulcerative lesions do not differ essentially from resolutive tubercles in their objective characters. The cardinal distinction is found in their terminal stage. Instead of disappearing by a process of interstitial absorption, the tubercle softens in the center, the epidermal covering becomes thinned, breaks down, and there results an open

PLATE XIV.



Grouped Tubercular Syphilide (Fox).

ulcer, discharging a grayish-yellow, gummylike matter, which is apt to concrete into a grayish or greenish-black crust. The ulcerations are usually deep and abrupt, with inflamed, thickened, and hypertrophied borders. The ulceration varies in area and depth, and in the mode and rapidity of its extension; it may be phagedenic, perforating, or serpiginous in character.

The more or less grave significance of tuberculo-ulcerous lesions depends upon their location and the character of the inflammatory complications which occur in their course.

By far the most common localization of the tuberculo-ulcerous syphilide is the region of the face. Next in point of frequency is the scapular region, the neck, the legs, arms, and trunk. Upon the extremities they seem to have a preference for the bend of the elbows, the back of the hands, and the knees. Upon the face the lesions are often associated with swelling and hypertrophy of the tissues, producing an elephantiasic condition. The ulcerations are usually progressive, either by the enlargement of the ulcers or the development of new lesions in their neighborhood, which become confluent, assuming a circinate form (Fig. 9).

When situated upon the nose this form of tubercular syphilide often assumes a perforating character, penetrates the alæ and nasal septum, or the bony framework of the nose, causing more or less destruction of the parts and consequent deformity. When the inflammatory element takes on a phagedenic or gangrenous character, the destruction of tissue is rapid and extensive. The entire nose, the lips, or portions of the cheek may be swept away *en masse* within a few weeks.

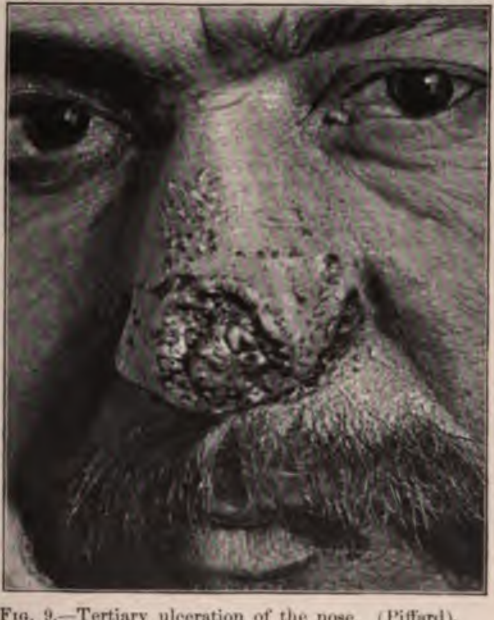


FIG. 9.—Tertiary ulceration of the nose. (Piffard).

By far the most common mode of extension of the morbid process is by serpiginous ulceration upon any portion of the body, but most often upon the face. An isolated tubercle appears, or a number of small tubercles grouped around a large tubercle, in a stellate or circular form. The necrobiotic process first attacks the older central tubercles; they become ulcerated and covered with brownish scabs, under which they gradually heal, while the patch spreads at its margins by the development of new tubercles. By this slow peripheral extension, with coincident cicatrization of the center, the patches present so many analogies with the lupus that it has been improperly designated as *syphilitic lupus*.

The reparative process is marked by the falling of the crusts, revealing a reddish cicatrix more or less irregular, and often traversed by bridles or raised bands of connective tissue. The scars ultimately become of a shining white color, and are more or less depressed according to the depth of the ulcerative process. The tuberculo-ulcerous syphilide has a wide chronological limit. It may develop any time, from the third to the fifteenth or twentieth year, or it may occur much earlier, as a manifestation of precocious syphilis. The statistics of Jullien show that fully

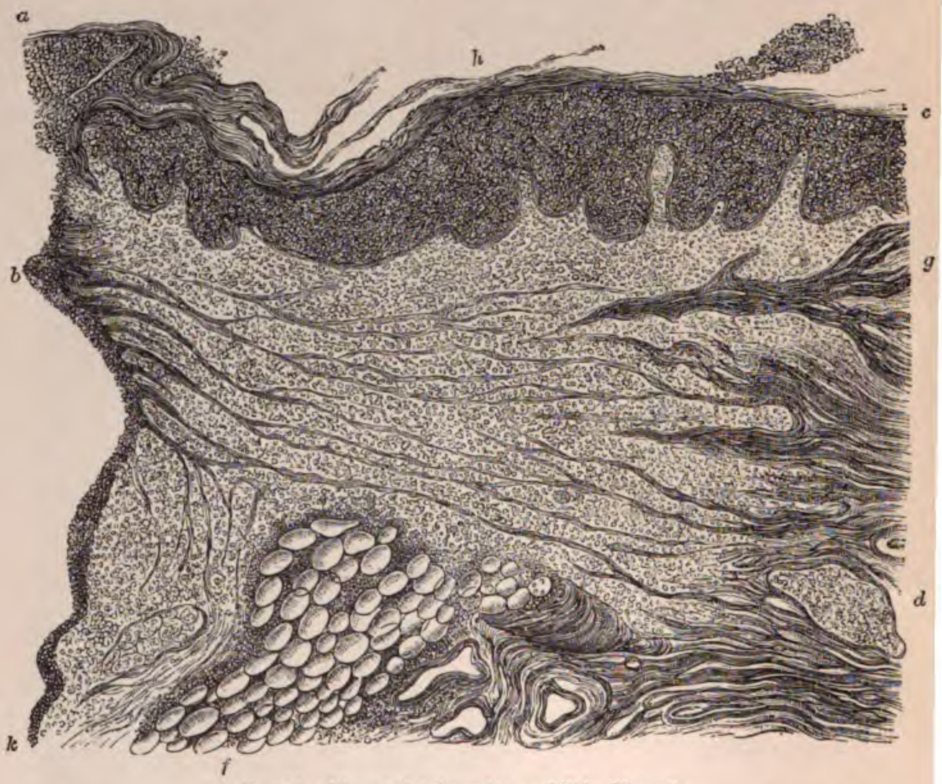


FIG. 10.—Ulcerated tubercular syphilide (Kaposi).

a, *c*, represents the mucous layer of Malpighii; from *h* to *c* the underlying papillæ are preserved and distinctly marked from the mucous layer, the cells of which are increased in volume; some of them, provided with several nuclei, are mingled with a great number of small granular elements; *a*, *b*, *k*, is the abrupt border of an ulcerated gummous focus, formed by a thick granular layer, the elements of which differ from healthy wounds in process of repair, and in the midst of which is recognized the cellular infiltration of the gumma.

one fourth of all tertiary manifestations may be grouped under this syphilide. According to the same author, the date of its development is materially retarded by the prompt institution of mercurial treatment.

ANATOMY.—The minute anatomical structure of the ulcerative tubercle is thus given by Kaposi: The histological characters of the syphilitic papule differ in no essential respect from those of the larger tubercle except in the greater extent and depth of the cellular infiltration. Otherwise it is the same perishable elements which constitute the infiltration, and show in the older (central) portion at the earliest period the granular opacity, an almost "dusty" appearance, while those at the periphery still permit the recognition of a nucleus which takes a distinct carmine stain, and of a normally granular protoplasm. Over the peripheral parts of the tubercle (*h c*) the papillæ are well preserved, distinctly marked from the mucous layer, the cells of the latter, besides, largely interspersed with small granular elements, or themselves enlarged, provided with several nuclei.

As the older atrophic portions are approached, and on the latter the demarcation between the rete and papillæ becomes indistinct, the penetration of the foreign element continues from the papillæ into the former; the rete then becomes narrower, and finally is altogether absent, when the cell-infiltrated corium is laid bare—beginning of the *ulceration*. Up to this point the appearance does not differ from that of a superficially exulcerated papule or the initial sclerosis.

As the ulceration progresses there occurs a loss of substance, which varies in depth, but which even in microscopic sections reproduces the naked-eye appearance (*a b*), and with reference to its possible depth and width in general is determined by the cellular infiltration. In the case of the gummous tubercle this must of course extend into the subcutaneous cellular tissue, may closely surround and fill all the included structures, glands, and follicles, crowd in between the fat-lobules, as seen at *f* enveloping the vessels, and, though pretty sharply demarcated peripherally (*d, e*), may also reach along the vessels variable distances beyond the infiltrated focus.

The abrupt, slightly undermined border, which is raised above the level (*a b*), as well as the further limiting wall (*b k*), are formed by a variably thick layer of a granular, crumbly mass, whose elements differ from the pus-cells of healthy granulating wounds, and behind which the cellular infiltration of the gummous node is recognizable.

This layer is the expression of the advancing necrobiosis of the specifically infiltrated tissue, and gives to the surface of the ulcer the well-known "lardaceous," "unclean," macroscopic appearance.

Diagnosis.—The tubercular syphilide may be mistaken for the *large papular syphilide*. As before indicated, the tubercle is intermediate pathologically between the papule and the gumma, the difference being one of degree, according to the depth, density, and volume of the infiltration. From their objective characters alone it is not always possible to distinguish the dermo-papillary infiltration represented by the papule from the slightly deeper and more solid infiltration of the tubercle. The papular syphilide is to be distinguished by its earlier appearance, its more general distribution, and its more rapid course. The papules in the course of their involution become flattened and scaly, often desquamating a number of times in succession. The lesions of the tubercular syphilide are isolated or grouped in patches; they rarely become eroded or scaly, but preserve their globular outline until resolution takes place; they leave indelible cicatrices.

There are a number of nonspecific skin diseases with which the tubercular syphilide may be confounded, the differentiation being particularly difficult when situated upon the hands and face.

The dry tubercular syphilide of the palms constitutes one of the varieties of the so-called *palmar psoriasis*; but true psoriasis of the palms or soles is so exceedingly rare that it may be eliminated from consideration.

In this region this syphilide bears a most deceptive resemblance to *chronic eczema*. Palmar eczema is, however, more apt to be characterized by scaling, fissuring, and serous exudation, attended with itching, and its outline is not so distinctly demarcated. In syphilis the infiltrated border is composed of small confluent tubercles, scalloped in outline and surrounded by a coppery areola.

Acne rosacea tuberosa may be mistaken for the tubercular syphilide. In syphilis the tubercles are smooth, glossy, and firm to the feel, and distinctly demarcated in their outlines. In acne the nodules are uneven, situated upon reddened and hypertrophied skin; dilated and tortuous capillaries are commonly present. The lesions of acne never undergo the degenerative and destructive changes which characterize syphilis in this region.

Parasitic sycosis may be mistaken for a tubercular syphilide, involving the hairy regions of the face. Sycosis directly involves the hair-follicles; the hairs are loosened and broken by parasitic infiltration and readily fall. The lesions are of a more intense, vivid red, less coppery in color; they readily suppurate; they are accompanied with a peculiar brawniness of the integument; they are limited to the beard, while syphilitic tubercles appear upon the nonhairy parts.

Rhino-scleroma is so exceedingly rare, in this country at least, that it may be practically eliminated; like syphilis, it is characterized by its tendency to destroy the soft parts and run a protracted course. The history of trauma of the nose preceding the development of the neoplasm, and the absence of concomitant signs of syphilis, will usually serve to exclude the latter.

Lupus vulgaris is of all nonspecific skin diseases the affection most likely to be confounded with the tubercular syphilide, especially when the latter is localized in regions for which lupus shows a predilection. There is not only a resemblance in the form, configuration, and other objective characters of the lesions, but numerous analogies in its course, and the peculiar types assumed by the morbid process. The nodules of lupus, like those of the dry or atrophic tubercular syphilide, may undergo interstitial atrophy and disappear without open ulceration; also, like the lesions of the ulcerative variety, the lupus nodules may soften, break down, and result in the formation of open or scabbed ulcers. The most characteristic resemblance is found in their peripheral enlargement by the development of new lesions, and their tendency to a serpiginous mode of advance. The lupus process is, however, much slower in evolution, its sluggish development and progress as compared with syphilis constituting a cardinal point of distinction. Lupus vulgaris generally appears in early life before puberty, while acquired syphilis is essentially a disease of adult life.

The tubercles of lupus are pinkish, translucent, of an apple-jelly color, more irregular in outline, and the surrounding integument is often studded with minute colloid masses resembling milia. They are surrounded by an inflammatory zone which gradually fades into the normal skin, in contradistinction to the sharply defined, coppery areola of syphilitic nodules. The ulcers of lupus are of an irregular shape, not so sharply cut, the edges are softer and easily bleed, indolent, and painless. Syphilitic ulcers are rounder, deeper, undermined, the edges indurated, frequently painful on pressure. The secretions of lupus ulcers is less abundant, and the crusts are less bulky and do not present the greenish-black color characteristic of syphilis. The process of cicatrization is slower in lupus, and the scars are thick, dense, puckered or radiating, not so smooth and depressed as in syphilis.

Notwithstanding these points of differentiation, it is often difficult to decide whether we have to deal with a lupus vulgaris or a tubercular syphilide, especially when situated in the region of the nose; both may occasion considerable destruction of tissue and consequent deformity. In lupus the ulcerative process always proceeds from the surface to the deeper structures; it may destroy the cartilaginous septum, but does not attack the bony part of the nose. When the alæ and tip of the nose are destroyed these parts present the appearance as if they had been nibbled or gnawed away, and the organ is sharpened as well as shortened. Syphilitic ulceration more often begins in the bony structures, and involves the superficial parts secondarily; the organ may be destroyed in its totality; an offensive symptom, known as syphilitic ozena, is commonly present.

Epitheliomatous ulcers of the nose and face may be mistaken for the tuberculo-ulcerous syphilide. The hard, everted border of epithelioma, the granulating fungous character of the base, its limitation as a rule to a single isolated lesion, its sluggish course, the glandular enlargements and accompanying cachexia, and the fact that it is confined almost exclusively to the aged, will serve for purposes of differentiation.

The tubercular syphilide bears a most deceptive resemblance to *leprosy*, especially when the lesions are hypertrophied and situated upon the brow and lobes of the ears. The leontiasis of leprosy is more pronounced than that of syphilis. The enormous nodular masses, the deep, supra-orbital furrows, the pillowy protuberances of the cheeks, with loss of the eyebrows and lashes, are not observed in syphilis.

The leprous neoplasms are softer to the feel, larger in volume, more protuberant, and crowded upon an infiltrated base with œdema of the skin and ganglionic enlargements. Their seats of predilection are the facial mask, ears, back of hands, and forearms. The nodules of syphilis are more globular in outline, more apt to be grouped and more rapid in involution. Anæsthesia is often present in the center of a patch of leprous tubercles or its immediate neighborhood, but absent in syphilis.

The anæsthetic form of leprosy would hardly be mistaken for syphilis. Still, it is well to bear in mind that the loss of the extremities, fingers, toes, and feet, may result from syphilis. Mutilations from this cause are, however, quite exceptional.

The Gummatous Syphilide.—When the syphilitic cell infiltration takes place in the subcutaneous cellular tissue the nodular mass thus formed is termed a gumma. This term was formerly restricted exclusively to the products of syphilis, but more recently it has been applied to the somewhat analogous formations of scrofuloderma.

The gumma consists essentially of a nodular or solid tumor more or less distinctly circumscribed by the condensation of the connective tissue at its periphery, forming a limiting membrane. The neoplasm is deeply seated in the subcutaneous or submucous tissues, often involving the muscles, periosteum, and bones. The skin at first freely glides over the tumor and is involved only secondarily and by ulceration after preliminary softening and breaking down of the neoplastic elements. Exceptionally resorption may take place and the tumor disappear without the intervention of the ulcerative process.

The color and consistence vary according to the stage of their development. When recent, the integument is of a reddish or coppery color, which deepens into a brownish red or livid tint as they grow older. They are dense and firm to the feel, but as the ulcerative process sets in they become soft and doughy, with evidences of fluctuation.

Gummata vary also in form, volume, multiplicity, and the date of their development. They are usually globular or oval, sometimes irregularly flattened, the external form being determined by the anatomical relations of the tissues in which they are implanted. Where the cellular tissue is loose and abundant they are usually globular or spherical; they are elongated or acorn-shaped along the fingers, flattened upon the cranium.

In volume they vary from that of a pea or cherry to that of an egg or an orange; they are usually described as nut-sized tumors. In a case of Fournier's a single tumor measured fourteen centimetres in length, eight to ten in breadth, with a thickness varying from two to six centimetres. When deeply seated, or when the infiltration is diffuse, they may cause no marked projection above the surface. Their number is usually quite limited, from one to a half dozen or more; exceptionally they may be quite numerous, as in the case reported by Lisfranc, in which one hundred and sixty were counted upon the arms and legs of a patient. As a rule there is a certain ratio between their size and multiplicity; the more numerous, the smaller they are, with a greater tendency to disappear by resolution.

As regards the date of their occurrence, gummata rarely develop before the third or fourth year of syphilis, sometimes not until the twentieth, thirtieth, or fortieth year. They may continue to recur in a succession of crops during a long series of years, or they may represent the awakening into activity of the syphilitic diathesis after it has remained dormant for years. On the other hand, they may appear as precocious accidents in malignant syphilis within the first few months after infection. Mauriac has reported cases in which large nodular neoplasms with, as the typical characters of gummata, which softened and were converted into deep, cavernous ulcers, developed within a few months after the appearance of the chancre. The same author has described, under the title of *érythème noueux syphilitique*, certain dermic and hypodermic nodules which appear comparatively early in syphilis, sometimes as early as the fourth month, and which are essentially resolutive. The tumors, which are habitually seated upon the legs and forearms, more rarely disseminated over the trunk, consist of ovoid or irregular protuberances, from the size of a nut to that of an egg. The nodules may be free and perfectly mobile in the subcutaneous cellular tissue, or the inflammatory condition may be so intense as to cause an œdematous infiltration which renders the neoplasms adherent with the superimposed derma. Their color is of a rosy red at the periphery, and of a somber red, deepening to an ecchymotic tint in the center, and does not completely disappear upon pressure. The ecchymotic tint generally pales and turns yellow in the course of their involution, which is invariably by resolution. Their entire duration rarely exceeds thirty or forty days. Not infrequently relapses take place after a short period. They are attended with rheumatoid pains, characterized by nocturnal exacerbations.

Gummous neoplasms are usually isolated, sometimes confluent, forming veritable tumors of large dimensions. A tendency to symmetry has been noticed in particular locations, as about the ankles. They are characterized by an exceeding slowness of evolution; they are essentially aphlegmatic, indolent, and insensitive; they may be painful in certain regions, as upon the cranium, or from the accident of pressure upon a cutaneous nerve. They are rarely attended with marked constitutional disturbance.

In the ordinary evolution of the gumma three principal stages may be distinguished: the formative, the ulcerative, and the reparative.

In the *formative stage* the tumor grows gradually until it attains its full development, appearing as a rounded hypodermic nodule of firm consistence, readily movable, and over which the skin freely glides. In this condition it may remain without perceptible change for weeks and months.

The *stage of ulceration* is marked by evidences of softening of the center of the tumor, which loses its firm consistence and gives a deceptive indication of the presence of pus; coincident with this central softening, the overlying integument appears inflamed, reddened, and thin, and finally becomes perforated at its most prominent point. Through this opening the liquefied disintegrated products, consisting of a thick, viscid, gummylike material, exude. The sphacelated connective tissue, resembling the core of a furuncle, still remains attached to its subcutaneous connections, and is gradually eliminated. If the gumma be very voluminous, there may be a number of openings at different points of the surface.

The gummatous ulcer thus left is a circumscribed, more or less deep, circular excavation, with thickened and adherent borders, the walls undermined, the floor uneven, covered with broken-down tissue, which is gradually detached and thrown off with the sero-purulent secretion from the walls of the cavity, in the form of a slough or shreds and filaments. Two or more contiguous ulcers may unite, the resulting lesion presenting a bicyclic contour. Not infrequently a number of gummata are disposed in a group, each of them opening by a single orifice; as they enlarge by ulceration the intervening tissues are swept away, and the cavities unite, forming a vast excavated ulcer.

When the broken-down and necrosed tissue is completely eliminated the *reparative process* begins by the clearing up of the floor of the ulcer, which becomes covered with healthy granulations; the thickened borders are effaced, and the cavity is more or less completely filled up by cicatricial tissue. The resulting cicatrix is usually circular, smooth, white in the center and brown at the periphery, its size, contour, and depression bearing a definite relation to the area and depth of the destructive process; it is frequently immobile and adherent to the parts beneath, especially when situated over a bony surface.

The course and general characters of gummatous ulcers are modified according to their location and the intercurrence of certain morbid processes—inflammation, gangrene, phagedenism, etc. While gummata may develop upon any portion of the cutaneous surface, their seat of predilection is upon the lower extremities, the upper and middle third of the leg, and about the ankles; next, perhaps, in point of frequency, is the face, especially the forehead and scalp; the palms and soles enjoy an almost absolute exemption.

The predilection of gummata for the legs is doubtless determined by certain dystrophic conditions here present, as varicose veins, the contusions and various traumatisms to which these parts are subject. In this location we find that they exhibit a greater rapidity of development, are more frequently the seat of inflammatory complications, and more quickly break down and form open cavities (Plate XV). They are apt to be attended with marked œdematous infiltration, causing an increase in the size of the limb; the integument becomes hard, brawny, and often thrown into folds about the ankles, sometimes presenting an elephantiasic condition. Gummatous ulcers of the legs, when complicated with phage-

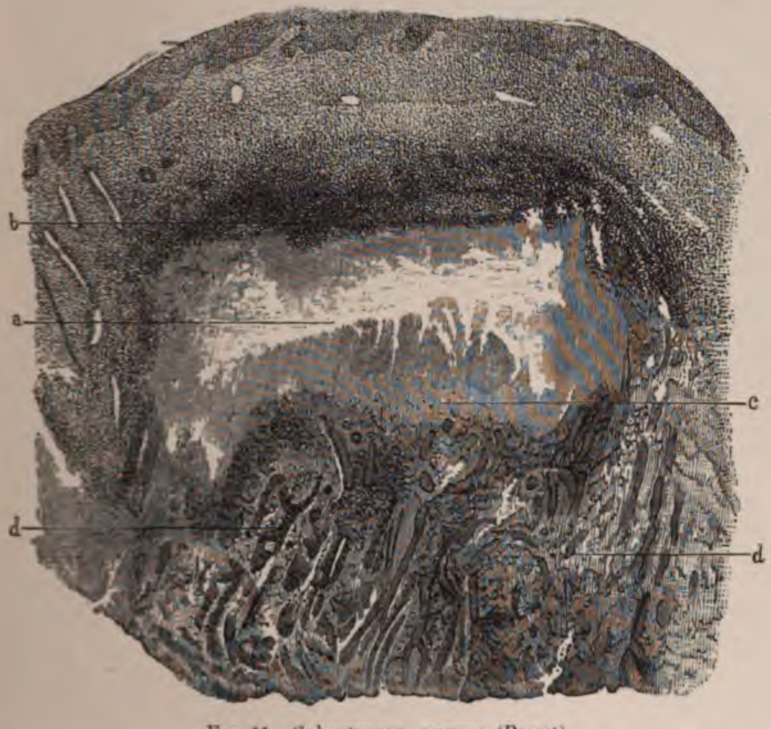


FIG. 11.—Subcutaneous gumma (Basset).

The central caseous part *a* is constituted by elements in process of degeneration, cellules with nuclei staining poorly, infiltrations of fatty and pigmentary droplets, disaggregated globules, eslastic fibers disintegrated, colloid granulations. Entirely surrounding it is proliferated tissue, *b*, in certain points, *d*, becoming sclerosed: many round cells with nucleus distinctly colored by carmine mingled with connective fibers here and there; *c*, the condensed tissue forms a distinct border (Malassez). One may also see, but more rarely, some giant cells.

denism, may destroy the aponeurosis of the leg, or may penetrate more deeply, destroying all the subjacent tissues, and laying bare the bones.

Gummatous ulcers of the face are often followed by deforming cicatrices, salivary fistulæ, ectropia, etc.; upon the forehead they may destroy the external table of the frontal bone, and involve the frontal sinuses. Gummata of the nose, the ocular and auditory apparatus, are considered in other sections of this work. Upon the hairy scalp gummatous ulceration is often profound and destructive; the external table or the entire thickness of the skull may be perforated, exposing the dura mater.

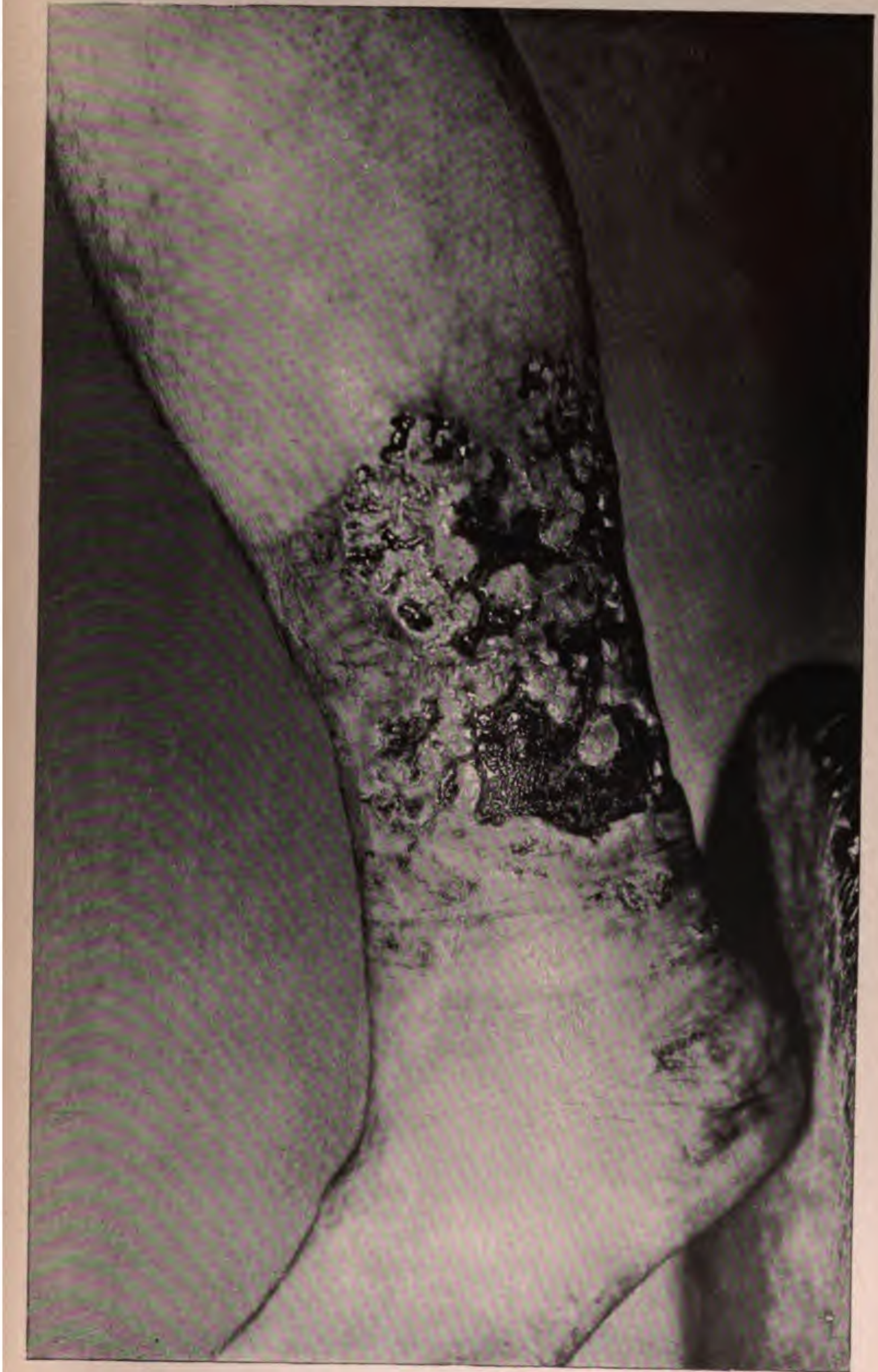
In the groins, about the genital and perigenital parts, gummatous ulcerations may cause deep and extensive destruction of important organs, erosion of important vessels, with dangerous and even fatal hæmorrhage. The mutilations and contracting cicatrices of the penile organs may lead to impotence. Upon the abdomen they are fortunately rare, since in this location they are apt to form vast serpiginous ulcerations, which involve the entire thickness of the abdominal walls.

The objective characters and course of gummatous ulcers are also modified in a marked degree by certain pathological coincidences. The influence of diathetic conditions, as scrofula, etc., has already been referred to as impressing a peculiar morbid type upon the syphilitic process. Syphilitic ulcers occurring in scrofulous individuals are apt to be indolent and persistent, and assume a scrofulous aspect, which suggests a morbid hybridity.

Similarly we find that a syphilitic ulcer may become covered with granular masses or papillary new growths which give it a deceptive resemblance to epithelioma, and has led to its improper designation as cancer-syphilis or syphilo-cancer. While the possibility of a combination of the syphilitic and cancerous process, or a transformation of one into the other, can not be admitted, yet clinical observation shows that the tissue damage effected by syphilis predisposes to the development of cancer, by constituting a *locus minoris resistentiæ*. Examples of cancer occurring in cicatrices left by syphilitic ulcers, or even in the ulcers themselves, are numerous and well authenticated.

ANATOMY.—The histological characters of the gumma do not differ essentially from those already given in connection with the anatomy of the tubercle. According to Kaposi, the conditions are somewhat different in the subcutaneous gummous tubercle, but only in so far as the manner and progress of the metamorphosis are determined by their deeper seat and their greater bulk. "I can not agree with some authors who maintain that the peripheral part of the gumma changes into fibrous connective tissues, into a cicatrix, while the inner portion becomes limited as a spherical tubercle which alone is said to undergo the retrograde metamorphosis into mucous softening, fatty degeneration, or cheesy thickening. The whole of the gumma, like the smallest syphi-

PLATE XV.



GUMMATOUS ULCERATION OF LEG (Piffard).

litic nodule, undergoes retrogression, atrophy, suppuration, or liquefaction, and never changes into permanent connective-tissue formation."

Diagnosis.—The diagnosis of the earlier manifestations of syphilis is usually aided by the history of a chancre and the presence of concomitant specific lesions; the gumma, however, which develops at an advanced age of the diathesis, ordinarily stands alone as the sole morbid expression, and the patient rarely associates it with an unfortunate experience of many years ago, which he may have forgotten. In most cases it is necessary to rely solely upon the objective characters of the lesion. A gummy tumor is so typical in its mode of evolution that a mistake could scarcely be made if the various stages of its progressive metamorphosis came under the physician's observation. Unfortunately, however, this process is ordinarily too slow and chronic to afford the opportunity. In either stage the gumma may be mistaken for certain nonspecific lesions: in the stage of tumefaction it may simulate various solid tumors, as sarcoma, lipoma, fibroma, or an enlarged ganglion; in the stage of softening it presents certain analogies with an ordinary abscess, a furuncle, suppurating gland, etc.; in the final stage it may bear a deceptive resemblance to chancroid, epithelioma, lupus, and various ulcerative lesions.

Lipoma may be differentiated from a gumma by its more flattened, diffuse, and less globular form, its softer consistence, greater compressibility, and its absence from the regions of preference for gummata.

Sarcomatous tumors are more generally distributed, with a predilection for the trunk; the overlying skin is changed in color, bluish or purplish, and they do not disappear by resorption.

Scrofulous gummata, which present close structural and clinical analogies with syphilitic gummata, are ranged always along the course of the lymphatics in a manner quite characteristic; they are more indolent, painless, and persistent.

The *ulcus cruris* from varicose veins may be mistaken for a syphilitic ulcer. The constant presence of varicose veins, the frequent concomitance of eczematous infiltration and hypertrophy of the skin, the pronounced pigmentation from long-continued congestion, and their more frequent localization on the lower third of the legs, are diagnostic points. Syphilitic ulcers occur commonly in the middle and upper third of the leg; their borders are apt to be festooned from the confluence of contiguous lesions, and the surrounding skin is normal.

An ulcerated gumma of the genitals often presents a most deceptive resemblance to the *initial lesion*, but the ulceration is deeper, more perforating in character, and the edges are undermined rather than sloping. It may also be mistaken for *chancroid*.

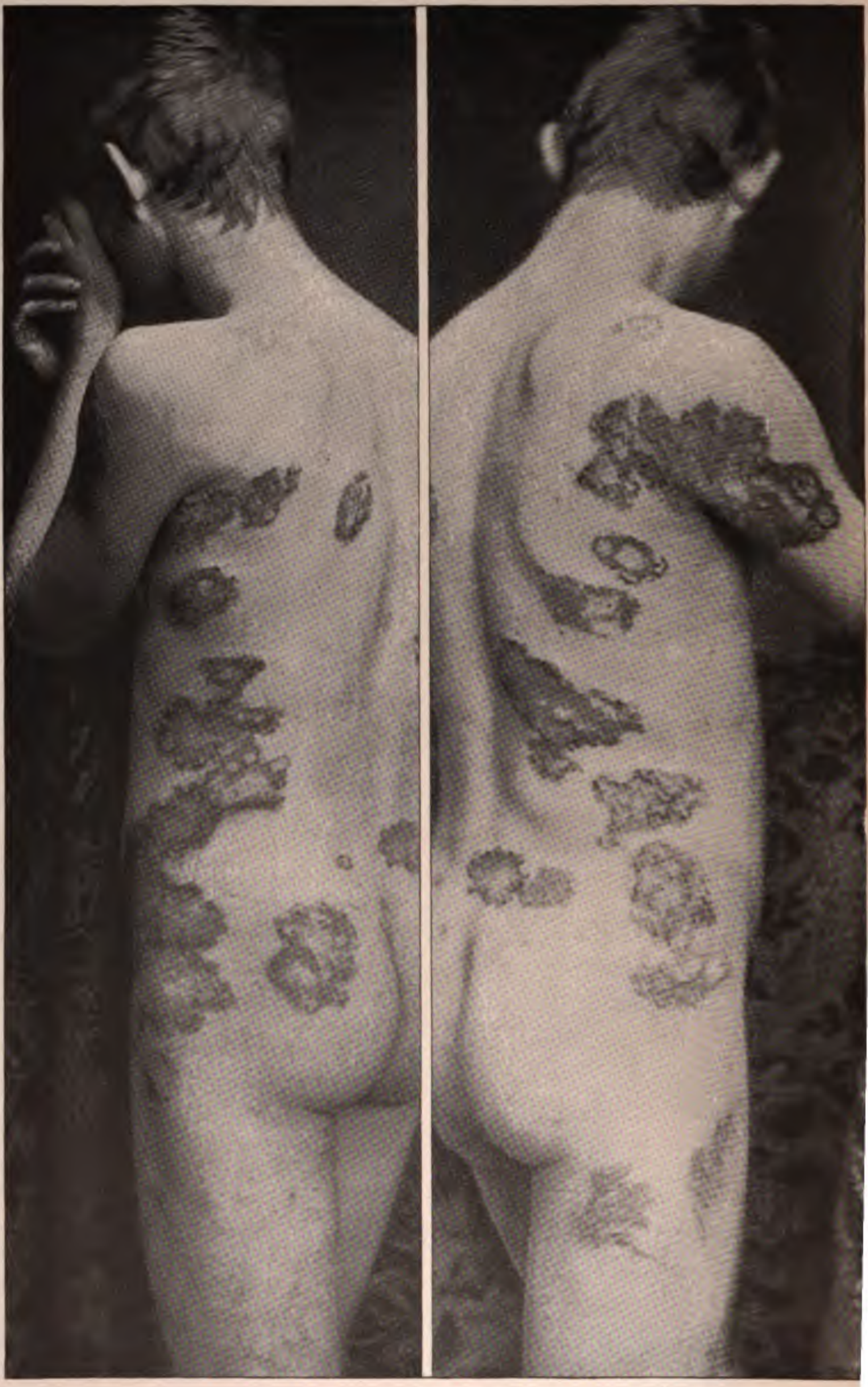
Epithelioma is frequently confounded with an ulcerated gumma, especially when situated upon the tongue or genitals. Epithelioma is characterized by its development from a warty base and its slow development, often remaining stationary for a long period before the ulcerative process sets in. There are always evidences of new growth in its hard, everted border, which is not pigmented. When it breaks down it shows an irregular, firm, granular base, with warty or papillary excrescences. While syphilitic ulcers are commonly multiple, a carcinomatous ulcer is single, its secretion is scanty and offensive, and does not concrete into crusts; the ulceration always begins externally and extends into the deeper parts, and its superficial area is large in proportion to its depth. Pain of a lancinating character is a common symptom. Implication of the neighboring lymphatic ganglia and evidences of the cancerous cachexia are important but by no means constant diagnostic signs. Epithelioma is usually a condition of advanced life, while gummatous ulcers may occur at any age. Histological examination will oftentimes throw an important light on a doubtful case; this may, however, be inconclusive, and the most valuable means of differentiation that we possess is specific treatment. Under the active use of the iodide of potassium, alone or combined with local mercurialization, the features of a syphilitic ulcer show unmistakable changes within a week or ten days. It may be laid down as a safe and judicious rule, in the case of all lesions of a possibly syphilitic nature, to employ a preliminary specific treatment before resorting to surgical interference. Especially is this true of doubtful lesions occurring upon the face, the breast, or the genitals.

In cases of tumors or ulcerations of ambiguous identity Jullien highly extols the superior value of the hypodermatic injection of calomel as a test medicine, and this, irrespective of the duration of the neoplasm or the age of the diathesis. He declares that a therapeutic diagnosis of syphilis may be clearly defined in eight days by calomel injections.

THE SERPIGINOUS SYPHILIDE.

The tendency to spread at the periphery while healing in the center is a characteristic of all syphilitic infiltrations. We have seen that many circinate lesions of the papular type are formed by the development of new papules at the margins of a patch, while resolution takes place in the center. In the lesions of the tertiary stage, however, this tendency to invade adjacent tissues by spreading at the edges is a much more marked and important feature.

The term "serpiginous syphilide" is applied to lesions whose mode of advance is by ulceration at the periphery, with coincident cicatrization of the center. The ambulant, creeping character of the ulcerative process is independent of the histological characters of the generative lesion, as it may originate in a pustule, a tubercle, or a gumma. The peculiarity in its mode of extension would seem to depend upon a local infective



Superficial Serpiginous Syphilide.

process. The serpiginous mode of extension is by no means confined to syphilitic lesions, but may be manifest in nonspecific affections, as chancroid, lupus, etc.

According to the depth of its destructive action, two varieties of the serpiginous syphilide are recognized—the superficial and the deep.

The *superficial serpiginous syphilide* commonly originates from a single pustule or tubercle, or a number of contiguous lesions which run together, forming a round or oval patch, superficially ulcerated and covered with crusts. Its mode of extension is as follows: As the healing process takes place, the crusts fall off in the central portion, leaving a ring of encircling crusts at the periphery; coincident with the central cicatrization the ulcerative process advances, forming a ring or furrow of ulceration at the periphery, which in turn becomes covered with a greenish-black rim of crusts formed by the rapidly concrescible purulent secretion. The lesion presents thus a pigmented cicatricial center, surrounded by a rim of crusts half an inch to an inch in diameter, covering an ulcerated furrow, beyond which extends a coppery-red infiltrated areola. This process may continue for months or years, the peripheral evolution keeping pace with the central insolution, and we thus have a continually widening circle or ulceration inclosing a constantly increasing area of scar tissue. Plate XVI represents a superficial serpiginous syphilide, more or less generalized, in which the reparative process has been completed.

Instead of this strictly centrifugal mode of extension forming round or oval patches, one segment of the circle may entirely heal while the ulcerative process advances at the other portion of the circumferential border, producing crescentic, reniform, or horseshoe-shaped patches. In this manner the migratory ulceration may sweep over large surfaces, its direction in one way or the other being determined by the peculiarities of the tissues. When situated upon the limbs it rather tends in the direction of their long axis than to their complete encirclement, forming elongated oval patches. Upon the face and trunk the ulceration is more apt to maintain a distinctly circular contour. The course of the serpiginous syphilide is essentially chronic; its duration is always protracted, unless terminated by the intervention of active specific treatment.

The *deep, serpiginous syphilide* differs from the preceding in the deeper-seated character of the lesions, which serve as the focus of ulceration, and the greater depth of the destructive process. Plate XVII represents a deep serpiginous syphilide seen in process of extension on the arm and face. It more commonly originates in lesions of the tubercular or gummatous type, and its chronological position is at a more advanced stage of the diathesis. It may develop from a single tubercle or from a number of nodules circularly grouped. The older central nodules first undergo disintegration, ulcerate, and become surmounted by a crust, underneath which cicatrization takes place. The outlying nodules in turn break down, forming a deep fossa of ulceration, which is soon covered with a ring of greenish or blackish crusts. The process is perpetuated by the evolution of new nodules at the periphery, forming a solid wall of infiltration, which in turn becomes plowed up by an ulcerative furrow half an inch or more in width, and sharply cut, as if it had been dug out by a gouge. The outer border of the ulceration is always steep or undermined, and deeper, while the inner margin is more shallow, and sloping gradually. The crust is likewise thicker and more prominent at the outer edge.

In some cases the ulcerative process is so rapid and profound as to approach the character of phagedena, and has led to its designation as *phagedinisme serpigineux*. It attacks the deep, subcutaneous cellular tissue and the underlying structures in the form of vast excavated ulcers, which are most formidable in their profound and destructive effects.

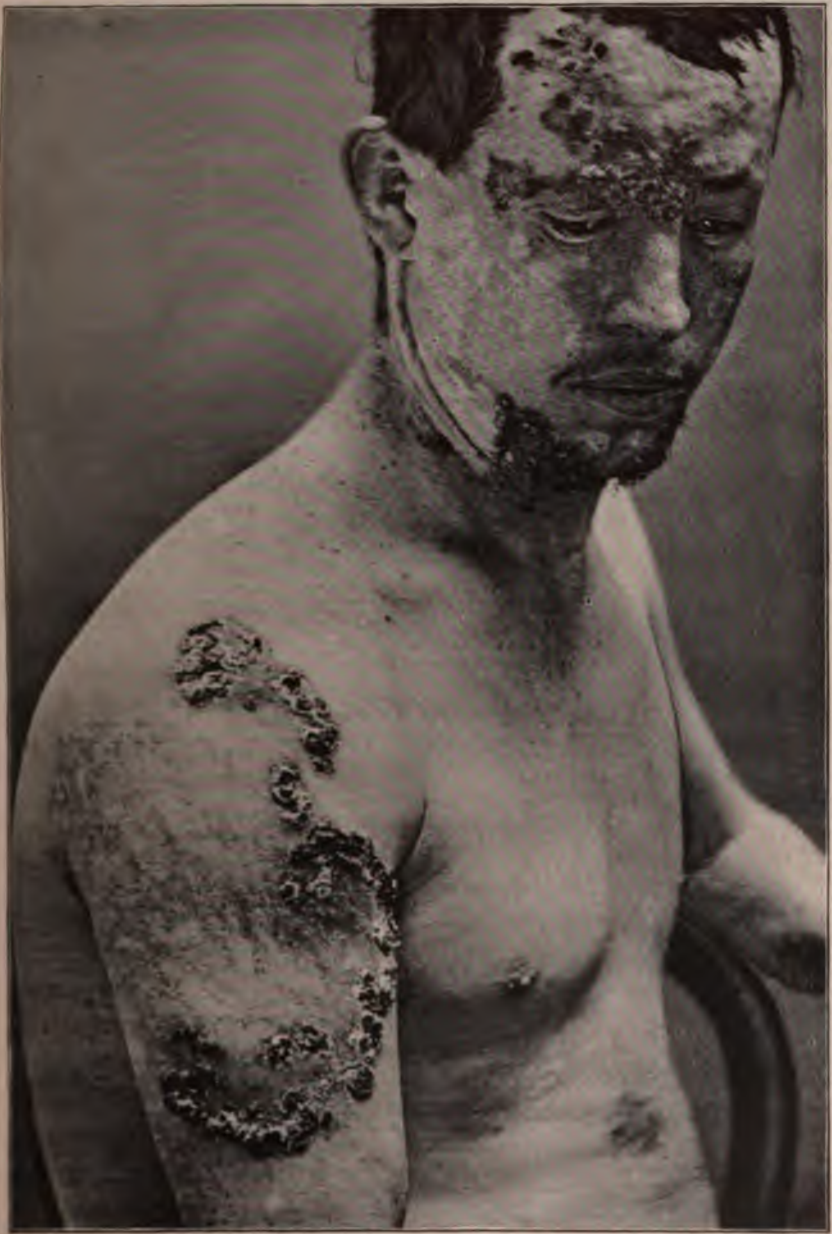
Diagnosis.—The development and mode of extension of the ulcerative process are so typical and distinctive that the serpiginous syphilide can hardly be confounded with any other disease, except perhaps lupus, and that form of phagedenic chancroid in which the ulcerative process pursues a sinuous or serpentine course.

Lupus serpiginosus is essentially a disease of early life, and is commonly confined to the face and extremities. The differential characters of lupus and syphilitic ulcerations have already been referred to. Instead of the solid wall of infiltration, surrounded by a well-defined coppery areola, the boundary line of serpiginous lupus is not continuous, but is broken up into fragments of circles, separated from each other by cicatrized surfaces. The ulcerous band which marks the extension of the destructive process is shallower, narrower, more ribbonlike; the crusts which cover it are thinner and more adherent. The entire process is more superficial than in syphilis. The cicatrices of serpiginous lupus are not so smooth as those of syphilis; they are uneven, and traversed by interlacing bands of connective tissue which give them the aspect of scars produced by burns.

The serpiginous syphilide is ambulant in character, creeping over large surfaces, while lupus is more limited and localized.

Serpiginous chancroid is almost invariably found in the genital or perigenital region, and never occurs upon the face and other parts for which syphilis manifests a predilection. The ulcerative process is not preceded by neoplastic infiltration, but advances by undermining the skin and dissecting up the tissues; the secretion is less abundant, and does not form crusts.

PLATE XVII.



Deep Serpiginous Syphilide (Allen).

THE VEGETATING SYPHILIDE.

Under the title of *syphilis cutanea papillomatosa seu vegetans* has been described a complication of syphilitic infiltrations determined by an exaggerated hypertrophy of the papillæ. The tendency of moist lesions of the papular type to assume a condylomatous character under the influence of various local causes of irritation has already been referred to in connection with the metamorphic phases of the flat condyloma. Unna has advanced the theory that the vegetating syphilide owes its origin to a moist seborrhœic eczema combined with syphilis.

Hypertrophy of the papillæ also occurs in connection with rupial or pustulo-ulcerous syphilides, and tuberculous or gummatous infiltrations with an ulcerated base. That the papillomatous element is not essentially syphilitic, but is due to certain localizing influences in the skin, is evident from the fact that many nonspecific lesions—as scrofulous and lupoid ulcerations, phagedenic ulcers, pemphigus, sycosis, etc.—are subject to the same pathological process. The morphological characters of papillary proliferations of syphilitic origin differ in no essential particular from the papillomatous production which may follow any chronic inflammation of the skin. In both cases there is a hyperplasia of the papillæ, which become elongated and prominent, giving the vegetations a mammillated or verrucose aspect.

The papillary proliferations which appear upon tertiary ulcers often form large verrucose vegetating masses, which present a most deceptive resemblance to the papillomatous growths of the skin known as frambœsia, or yaws. The clinical resemblance of the vegetations of frambœsia to syphilis is so close and deceptive that for a long time the existence of the former as an independent disease was denied. Most authorities, however, now recognize it as a disease *sui generis*, and bearing no relation to syphilis.

The vegetating syphilide has a predilection for regions of the body provided with hairs, especially the scalp and bearded portion of the face, the axillary folds, the genital regions, and about the anus. It is also found along the nasojugal and nasolabial folds, the commissure of the lips often extending to the brow, cheeks, and chin. In these regions the vegetations appear as irregular rounded protuberances or tumors of variable size, of uneven elevation, and secreting a puriform fluid, which concretes into thin, yellowish crusts. The removal of the crusts reveals a red, rugous surface, made up of villous or fleshlike excrescences. Involution may occur by a process of ulceration, or the vegetations may become sphacelated and detached *en masse*.

Diagnosis.—Since the papillary proliferations which constitute the distinctive feature of the vegetating syphilide present the same morphological characters with those occurring as a sequence of various other pathological states, the differential diagnosis is sometimes difficult.

Frambœsia presents numerous analogies with syphilis in its clinical features and mode of development. It begins with nodosities disseminated at first but afterward confluent, which become excoriated and humid, and covered with papillary excrescences. It is distinguished by the peculiar fungating character of the eruption, the acid reaction of its secretion, and the absence of certain pathological coincidences common to syphilis, as enlarged glands, alopecia, iritis, etc., and its failure to respond to mercurial treatment. Frambœsia is, moreover, a comparatively rare disease, and confined to tropical countries.

Pemphigus vegetans is another affection which presents such a marked objective resemblance to the vegetating syphilide that the earlier observers denied its distinct clinical entity and classed it as a manifestation of syphilis. The primary lesion of pemphigus is always a bulla which becomes exulcerated; upon the red, humid surface rapidly spring up papillary excrescences closely resembling condylomata lata. The patch extends by the development of new bullæ at the periphery, and by the confluence of contiguous patches are formed serpiginous lesions which advance over large surfaces. It is differentiated by the pronounced cachexia, which is present from the first or speedily supervenes, and almost invariably leads to a fatal termination from exhaustion or intercurrent disease.

Certain forms of *lupus* which undergo a hypertrophic evolution present the most deceptive resemblance to the vegetating syphilide. A variety of lupus described by myself as *tuberculosis papillomatosa cutis* (Jour. Cut. and Gen.-Urin. Diseases, October and November, 1888) was at first mistaken for syphilis. In this case the papillomatous proliferations developed without pre-existing ulceration; but it is chiefly the hypertrophic vegetating ulcerative forms, which are classed as *lupus hypertrophicus* and *lupus verrucosus*, that most closely simulate syphilis.

Lupus is distinguished by the slowness of its evolution, the irregularities of the ulceration, the livid, fungous character of the papillomatous granulations, the softness of its base and borders, and its limitation, as a rule, to the face and extremities. The hard, brownish-red infiltration of the margins, which is a pathognomonic feature of the vegetating syphilide, is absent in lupus.

THE PIGMENTARY SYPHILIDE.

Pigmentary changes constitute a characteristic and more or less constant feature of the retrogressive stage of all syphilitic lesions. These changes consist of an excess or loss of pigment.

An excess of pigmentation is seen in the dark brownish stains which persist for a long time after the involution of neoplastic infiltrations. They are due to the escape of the normal pigmentary matter of the blood into the Malpighian layer and its subsequent metamorphosis.

A loss of pigment often occurs as a retrogressive phase of the maculo-papular syphilide, in which whitish spots or disks occupy the seat of the lesions. Loss of pigment is the ultimate and invariable feature of the cicatricial metamorphosis of pustular and ulcerative lesions which have caused destruction of the skin. Associated with this loss of pigment there is also an accumulation in the form of an areola around the scars, often persisting for a long time.

Such pigmentary changes may be regarded as the posthumous expression of an anterior syphilitic infiltration; they possess no especial clinical value, since they are common to the lesions of other dermatoses.

The pigmentary syphilide occurs as an independent eruption; the hyperpigmentation, which constitutes its essential feature, represents a primary process and develops *d'emblée* without pre-existing infiltration. In the course of its evolution the pigmented patches become the seat of leucodermatous changes from absorption or displacement of the pigment, which disappears from the center and increases at the periphery. This unequal distribution of pigment in adjacent surfaces creates by contrast the illusion of achromia, while at the same time it heightens the perception of hyperchromia. When fully developed, the pigmentary syphilide presents the macroscopical aspect of islets of white skin surrounded by pigmented zones. The apparent decolorization of the spots has led many observers to regard this as the essential feature, and it has been classed under the designation of syphilitic leucoderma or *pseudo-leucodermie syphilitique.*

The leucodermic aspect, however, is largely an optical illusion, created by contrast with the hyperpigmented zone. That the decolorization is apparent rather than real is evident from the results of microscopical studies, which show that the white spots have the characters of normal skin. Tanturri and Saintin claimed to have demonstrated, in the specimens they examined, that the white spots in reality contained even more pigment than the normal skin, although much less than the macroscopically pigmented zone.

The pigmentary syphilide was first described by Hardy and his pupil Pillon, under the designation of *syphilide pigmentaire du col*, from its presumed limitation to this region. While its seat of predilection is the neck, especially on the sides, it may have a much more general distribution over the trunk and thighs; the face, forearms, and wrists, the legs and soles being exempt. In women it is usually limited to the neck, while the generalized form is more common in men. It is seen oftener in brunettes than in blondes.

It is rather a rare condition, although not nearly of such infrequent occurrence as was formerly supposed, probably due to the fact that its connection with syphilis was not recognized. The chronological period of this syphilide is from the first few months to the second or third year, exceptionally much later.

The pigmentary syphilide presents different phases in its development and decline, the variation in its objective characters being due to modifications in the disposition and arrangement of the pigmentary proliferation, the confluence of contiguous lesions, etc. Fiveisky (Annales de Dermat. et de Syphilig., 1891) describes three forms of the pigmentary syphilide—the *marmoraceous*, the *spotted*, and the *retiform*. In its initial period there is a more or less uniform and diffuse pigmentation of the skin. As ordinarily seen in its period of development, the eruption consists of roundish or oval spots of variable size, from that of a lentil to that of a silver quarter, of a yellowish-brown or *café-au-lait* color, isolated or arranged in the form of a network. In the course of its evolution displacement of the pigment to the periphery takes place, and the roundish or oval spots become irregularly marginated or dentated, inclosing islets of apparently abnormally white skin, simulating leucoderma.

The patches do not desquamate or become elevated, and the surface remains unaltered in structure, irrespective of its duration, which is quite variable—from three to six months, or even longer. Exceptionally it may persist for several years. It is but little influenced by specific treatment. Although the pigmentary syphilide possesses little clinical importance apart from its undoubted value for diagnostic purposes, there has been much discussion as to its nature and the pathogenic mode of its production.

Kaposi and many of his German *confrères* deny the specific autonomy of this syphilide, while other Continental authorities look upon it as always secondary to an abortive roseola, or some other form of superficial eruption.

Maieff, who has made an exhaustive study of the macroscopical and microscopical characters of this syphilide, gives (Premier Congrès International de Derm. et de Syph., Comptes Rendus, 1890) the following conclusions as to its mode of production: The pigmentary syphilide develops under the influence of a chronic specific inflammation of the small blood-vessels of the skin. It is possible that this vascular lesion may itself be consecutive to the general troubles of nutrition which is remarked during the evolution of the syphilides in the condylomatous period. At all events, this syphilide has an evolution peculiar to itself, for otherwise it would be more frequent. At its *début* it presents itself as an endothelial affection, likewise as a cellular infiltration of the adventitia of the vessels. Such transformation of the vessels produces, as a result, a disorder of the circulation. In consequence, the red globules lose their pigment; it then infiltrates the adventitia of the vessels, the cells of the connective tissue, those of the derma and the Malpighian layer, and disposes itself also in the lymphatic canals. During the evolution of this process the greater number of the altered vessels are completely obliterated, the papillæ of the skin becomes stunted and then atrophied; then the pigmentation becomes less intense, until finally it entirely disappears, and at last only a white spot remains at the site of the affection.

Diagnosis.—The pigmentary syphilide is to be differentiated from the pigmentations and achromias which follow the erythematous and other forms of secondary syphilides by its mode of evolution and objective characters. The same may be said of its differentiation from idiopathic leucoderma or vitiligo.

The brownish patches of *chloasma* are frequently found on the face, which is exempt from the pigmentary syphilide.

From *tinea versicolor* it may be readily distinguished by the localization, the absence of desquamation, and the fact that the coloration is in the skin, and not in the epidermic scales. Moreover, the presence of a fungus may be easily demonstrated in the latter.

HÆMORRHAGIC SYPHILIS.

While there is no distinct eruptive form recognized as the hæmorrhagic or purpuric syphilide, there is abundant clinical evidence that hæmorrhages occasionally complicate ordinary syphilitic eruptions.

On account of the excessive vascular congestion which characterizes the cutaneous efflorescences of the early stage, hæmorrhagic effusions occur more frequently in connection with macular and papular syphilides. They may, however, complicate ecthymatous and ulcerative lesions of the later stage. When the transudation of blood takes place in the substance of the lesions the specific eruption presents the aspect of purpura; when the exudation occurs around them the clinical picture is that of a papular syphilide intermingled with a hæmorrhagic efflorescence, each preserving its ordinary characters.

Purpura complicating syphilitic roseola has been described as appearing in the form of plaques sprinkled with minute spots the size of a pin-point, of a somber red color, which does not disappear under pressure of the finger, without elevation, closely set, almost confluent. The plaques are of variable dimensions, one to six or eight centimetres in diameter, distributed more or less generally; the spots of roseola surround without encroaching upon them. Other observers have described larger and more diffuse hæmorrhagic lesions from the size of a millet seed to that of a dollar, discrete or confluent, complicating the papular syphilide. They are most commonly seen on the lower extremities.

Cornil has investigated the histological characters of hæmorrhagic papules. He found that there was an effusion of blood interposed between the papillæ and the rete mucosum, raising the latter up in places so that its prolongations and the superficial portion of the ducts of the sudorific glands were separated from the papillæ. He thinks that "these bloody effusions are a manifestation of the alteration of the blood in syphilis—of the diminution of the corpuscles. The blood more easily passes through the walls of the vessels; the latter are, moreover, dilated, and their walls are changed in the inflamed papillæ. In preparations of hæmorrhagic syphilitic papules the vessels are always found dilated and their walls thinned at the summit of the papillæ."

Behrend, who has made a study of *syphilis hæmorrhagica* in children, the subjects of inherited disease, in whom it is of much more frequent occurrence, regards the marked fragility of the blood-vessels and diminished coagulability of the blood as causes of the hæmorrhage.

The etiological relation of these hæmorrhagic effusions to syphilis has not been clearly established. Most authorities are inclined to the view that they are of the nature of a complication and always secondary to the syphilitic process. From the fact that alterations in the blood-vessels as well as quantitative changes in the corpuscular elements of the blood are among the most constant and characteristic expressions of syphilitic action, it is surprising that hæmorrhagic phenomena are not more common. I have seen and reported numerous cases of purpura occurring in syphilitics, but have always regarded it as a manifestation of iodism.

As contributory causes to the production of cutaneous hæmorrhages in syphilis may be mentioned alcoholism, varicose conditions of the lower limbs, and depraved states of the general health.

Hæmorrhagic syphilis is reputed to yield readily to the influence of specific treatment. Its transient character and its association with other specific symptoms will serve to differentiate it from hemophilia.

SYPHILIS OF THE APPENDAGES OF THE SKIN—THE HAIR AND THE NAILS.

BY SAMUEL ALEXANDER, M.D.

I. AFFECTIONS OF THE HAIRS (ALOPECIA).

AFFECTIONS of the hairs due to syphilis are not uncommon. The lesions are analogous in many respects to those which occur in syphilitic onychia and paronychia; but whereas the nails are lost only occasionally in syphilis, a more or less extensive falling out of the diseased hairs is the most important and is an invariable symptom of syphilitic affections of the latter. On this account it has been customary to describe all affections of the hairs due to syphilis by the generic title syphilitic alopecia.

The clinical aspect of syphilitic alopecia is exceedingly varied, but, as is the case with most of the cutaneous lesions of syphilis, there are certain essential characteristics by which the loss of hair due to syphilis may be distinguished from other forms of alopecia. There are two kinds of syphilitic hair affections: In one the loss of the hair is primary, and is due to the action of the syphilitic poison upon the nutrition of the hair. In the other variety the loss of the hair is consecutive to certain cutaneous lesions which interfere with the growth and development of the hair. Both varieties of alopecia may occur in the same person at the same time. The hairs upon any part of the body may become affected, but those of the head are most frequently lost. The scalp only may be affected, or disease of the hairs in this situation may be associated with a loss of hair from the beard, the eyebrows, the eyelashes, the axillæ, or the genitals. The hairs in all these situations may be affected at the same time or successively, but in most cases only the hairs of the head are diseased.

Syphilitic alopecia may be partial or complete; it may be general or circumscribed. Loss of all the hairs from the body is, however, rarely if ever met with in practice as a result of syphilis. The hairs are diseased with the same frequency in both sexes.

The loss of hair is a manifestation of secondary syphilis. It occurs most commonly during the first year of the disease, at a time shortly after the first general eruption. In cases that have not been treated or which have been treated improperly, or in which treatment has been suspended too soon, a loss of hair may occur at a later period. The hairs, however, are rarely affected after the second year. Syphilitic alopecia is always temporary, and no matter how extensive the loss of hair may have been, the resulting baldness is never permanent.

When the hairs are lost as a result of ulcerative syphilitic lesions which involve the hair-follicles, the baldness may be permanent, but such a condition can not be included among the varieties of true alopecia.

Cranial Alopecia.—There are two principal varieties of cranial alopecia: the first is primary, the second is consecutive. In primary alopecia the loss of hair occurs without any apparent local cause. It is probable that the poison of syphilis affects the nutrition of the hairs by its action upon their roots, or by its effect upon the general nutrition of the body, but the histological changes which result are not yet thoroughly understood.

In consecutive alopecia the growth of the hair is interfered with by certain cutaneous lesions which occur upon the scalp and involve the hair-follicles. Both varieties of alopecia may coexist in the same case, but the clinical aspect and pathology of each is distinct. Both are manifestations of secondary syphilis. The loss of hair is always temporary and never results in permanent baldness. Reproduction of the hair is certain to occur.

Consecutive Alopecia.—Any of the cutaneous syphilides occurring upon the scalp may interfere with the nutrition and growth of the hairs. The loss of the hair is confined to the site of the lesion. The number of hairs affected, therefore, depends upon the number and distribution of the lesions. The most common syphilitic lesions which cause alopecia are the papular or papulo-pustular syphilide, and the erythematous syphilide associated with desquamation. The first of these is characterized by the presence here and there upon the scalp of little papules which are not very prominent, varying in size from the head of a pin to that of a French bean, of a yellow or yellowish-brown color. These may be discrete or may occur in groups. These lesions itch slightly and may become eroded by scratching, the surface being then covered with a thin brownish scab consisting of dried blood. The hairs upon the site of these lesions after a time lose their luster, become dry and brittle, and fall out; small islands of baldness are thus produced. All the hairs involved by the lesion may fall out, or a part of them only may be lost. This form of alopecia may be and frequently is associated with the primary variety.

The other variety of consecutive alopecia is due to the occurrence of a furfuraceous roseola. The lesion in this form consists of pink or rose-colored lenticular spots, covered with very fine scales, the latter sometimes being almost microscopic. The lesions are discrete, but are so close together as to appear confluent. They are not limited to any special situation, but are found scattered here and there over the whole scalp. They are covered over with very fine scales, resembling a mild seborrhœa. The hairs involved by these lesions fall out. The baldness may be complete or partial. These lesions usually occur in irregularly scattered patches, more or less circular in shape. A number of circumscribed patches of baldness thus result, but the scalp exposed does not resemble that in true alopecia areata, as it has not the intensely white, shiny appearance seen in the latter, but is covered with fine scales.

This variety of alopecia may be associated with the primary type of the disease.

In certain cases of consecutive alopecia the presence of any eruption upon the scalp escapes notice until the hair has been lost. This is especially true in women.

Of the other syphilitic lesions which cause alopecia the pustular or impetiginous syphilide and the superficial syphilitic ecthyma deserve mention.

Primary or Simple Cranial Alopecia.—The etiology of this form of alopecia is not well understood. Preceding the falling out of the hairs the appearance of the latter may be more or less altered as the result of general nutritive disturbances. The diseased hairs lose their normal luster and brilliancy, become dry, stiff, and wiry, resembling the hairs of the cadaver or the false hairs of a wig. The shafts are brittle and break easily, and this gives an uneven appearance to the hair. In many cases, however, these changes do not occur, the alopecia being the only symptom.

There are two varieties of primary or simple cranial alopecia, in one of which the loss of hair is general, while in the other it is confined to limited areas. Both of these varieties may coexist in the same case. In the first there is a general thinning out of the hair; in the second the hairs fall out in tufts, causing circumscribed patches of baldness. The two varieties are usually associated.

The intensity of primary alopecia varies. In the mildest cases only a few hairs are lost, and the affection is not very noticeable. In other cases the alopecia is much more intense and the hairs fall out in great numbers. The passage of a comb or the fingers through the hair brings away a number of the diseased shafts. The falling out of the hair is also particularly noticeable whenever the hair is washed. More rarely the alopecia is more or less complete; there is a general thinning of the hair over the entire scalp, and here and there large areas of more or less complete baldness appear. In some cases there may be a loss of all the hairs; this, however, is rarely met with clinically.

Cranial alopecia is not confined to any special situation; it thus differs very markedly from other forms of alopecia for which it might be mistaken. Any part of the scalp may be involved; it occurs upon the occiput, upon the temporal regions, and upon the back and sides of the scalp. It is this irregularity in the clinical aspect which is the most marked characteristic of syphilitic alopecia.

Alopecia of the Eyebrows and Eyelashes.—Alopecia of the eyebrows, like that of the scalp, may be primary or consecutive. The hairs in this situation are more frequently lost in the female than in the male. *Primary alopecia* is much more common than the consecutive form. The loss of hair is irregular: there may be a general thinning of the eyebrows, and here and there little spots of complete baldness. The loss of hair is in most cases very slight, although all the hairs from both eyebrows may fall out. The loss of even a few hairs in these situations is very noticeable, and causes great distress to the patient.

In the *consecutive form* of alopecia the pustular and papulo-squamous syphilides are the most common of the cutaneous lesions which involve the hair-follicles of the eyebrows. In all cases the loss of hair is temporary, and a favorable prognosis may always be given.

The hairs from the eyelashes are much less frequently lost. This symptom occurs very exceptionally. The loss of hair is nearly always partial and incomplete. In certain cases, as the result of ulcerative syphilides, involving the border of the eyelids, the hair-follicles may be entirely destroyed, and the loss of the eyelashes in those cases is, of course, permanent.

Alopecia of the Genitals and of the Axillæ.—The hairs upon the genitals and in the axillæ may be lost as the result of syphilis. The alopecia in these situations may be primary or consecutive, partial or complete. The hair upon the mons veneris in the female and the pubes in the male may be entirely lost, but this occurs but rarely. The loss of hair in these situations, as from the other hairy portions of the body, is a manifestation of secondary syphilis, and the loss of hair is always temporary.

Alopecia of the Beard.—This is usually primary, owing to the infrequent occurrence of lesions upon the face. The loss of hair occurs in a similar manner to that of the scalp, the circumscribed form being more common than the general.

Diagnosis.—The symptoms of *congenital alopecia* in the various types of syphilitic alopecia are so characteristic that mistakes in diagnosis are not likely to occur. Alopecia as a result of hereditary syphilis does not differ in any respect from that in the acquired disease. Congenital alopecia from other causes is very rare. It is usually associated with other atrophic symptoms, and the baldness is always permanent, while in syphilitic alopecia it is temporary. Alopecia is never the only symptom of congenital syphilis, and the presence of other manifestations of the disease make the diagnosis easy.

Senile alopecia is distinguished from that due to syphilis by the date of its appearance, by the parts affected, and by its permanent character The hair first begins to be lost from the posterior part of the vertex and from the temporal region, and the baldness spreads forward and backward until the entire crown is denuded of hair, the latter being surrounded by a fringe of hair of varying width.

Syphilitic alopecia is not limited to any particular region. Scattered patches of baldness may occur over the entire scalp, the hair being thinned out in the intervening spaces. In syphilitic alopecia the baldness is never permanent.

Premature alopecia, or alopecia simplex, may occur at any age. The loss of hair may be associated with a dry seborrhœa. The baldness usually begins at the temporal regions or at the vertex, as in senile alopecia. The loss of hair is gradual. After a time a new growth of hair, shorter and finer in texture, replaces that which is lost, and this in turn falls out and is replaced by a still shorter growth. Improvement may occur under appropriate treatment, but permanent baldness should always be expected sooner or later. The temporal regions and the vertex become bald first, but complete baldness of the crown may not occur for several years after the disease begins. The situation of the bald areas, the gradual loss of hair, and the permanent character of the alopecia make the diagnosis easy.

Symptomatic alopecia, or premature baldness. Seborrhœa sicca is the most common cause of symptomatic alopecia, especially in women. It should never be mistaken for the consecutive type of syphilitic alopecia associated with a furfuraceous erythematous syphilide of the scalp. The loss of hair is more uniform and general than in syphilis, the scales are more abundant and are composed principally of fatty matter and broken-down epithelium, and the loss of hair is permanent.

Alopecia areata. In the ordinary types of alopecia areata the skin denuded of its hair is of an ivory-white color, smooth and shiny. In the circumscribed alopecia due to syphilis the loss of hair is caused by a circumscribed lesion of the scalp, and there is usually more or less thinning of the hair in the intervening spaces between the bald patches, which does not occur in alopecia areata. In certain cases of the latter disease the bald spots are depressed and atrophied, a condition not found in syphilis.

Ringworm of the scalp might possibly be mistaken for syphilis, especially when the fungus attacks the nails, but the presence of the trichophyton in ringworm establishes the diagnosis.

Psoriasis, when it affects the scalp, may cause more or less loss of hair. The lesions, however, in this disease are most marked along the border of the scalp, and the occurrence of psoriatic lesions elsewhere confirms the diagnosis.

Prognosis.—In syphilitic alopecia the loss of hair is never permanent. The hair may continue to fall out for some time. In most cases some hairs continue to fall out for a period varying from a few weeks to several months. In other cases this symptom may continue for a year or more. Treatment has a very marked effect in arresting syphilitic alopecia, but even if the disease is not treated the loss of hair finally ceases. The hairs lost are always replaced by a new growth; and no matter how complete the baldness may be, the scalp finally returns to its normal condition, a new growth of hair replacing that which has been lost. It very frequently happens that the growth of hair occurring after a syphilitic alopecia is thicker and stronger than that which was lost.

Treatment.—Syphilitic alopecia being a secondary manifestation, the treatment is the same as in other cutaneous lesions of this period. Local treatment is of secondary importance unless the loss of hair is associated, as it often is, with a dry seborrhœa. Moderate stimulation of the scalp is of some value. The head should be shampooed once or twice a week, and afterward a small quantity of vaseline should be well rubbed into the scalp. The numerous hair tonics which are employed produce little effect, and certainly do not check the falling out of the hair.

II. AFFECTIONS OF THE NAILS—ONYCHIA AND PARONYCHIA.

Affections of the nails due to syphilis are of two kinds, onychia and paronychia. In syphilitic onychia the nail itself is primarily affected, as the result of nutritive changes in the matrix or nail-bed, or in both of these. In syphilitic paronychia the tissues around the nail are first affected, the nail itself being secondarily involved by the extension of the lesion to the matrix or nail-bed.

The distinction between syphilitic onychia and syphilitic paronychia is one of importance. Some writers confuse the two affections, and describe them together as similar conditions. Syphilitic onychia consists essentially in some disturbance or interference with the nutrition of the nail, but the resulting pathological changes are imperfectly understood. It is never an inflammatory condition. Paronychia is always accompanied by inflammatory changes in the tissues about the nail, and often results in ulceration. Onychia and paronychia may occur together, and even involve the same nail. This, however, is not the rule.

Syphilitic Paronychia.—The lesions included under this term differ very much in their clinical aspect. They begin in the tissues about the nail, and by extension involve the matrix or nail-bed. In some cases, however, the nail is not affected. Paronychia may involve the toe nails, as well as those of the fingers. The lesions may be single, or a number of nails may be affected simultaneously or successively. As a rule more than one nail is involved. The lesions occur with the same frequency in both sexes.

Syphilitic paronychia may be divided into three principal types, as follows:

1. Dry syphilitic paronychia.
2. Inflammatory paronychia.
3. Ulcerative paronychia.

Dry Paronychia.—This is the commonest variety. It occurs more frequently upon the fingers than upon the toes, and, so far as my experience goes, is met with more often in women than in men. The lesion consists essentially in a thickening of the epidermis about the nail, resulting in successive exfoliations of the former. The chorium is more or less infiltrated, and in neglected cases or in cases of long standing it becomes thickened, fissured, and excoriated. The lesion begins at a point near the corner of the nail, at the end of the nail groove, as a slight prominence, it is very hard, and is due to hypertrophy of the epidermis at this point. This increases in size and in hardness, and resembles a small corn. It is extremely indolent, is not red but yellowish-white in color, and is slightly sensitive to pressure. The thickening of the epidermis may be limited to this small area of skin at the corner of the nail, or it may extend entirely around the edge of the nail.

The epidermis after a short time cracks, and the upper layers are exfoliated. These loosened layers of dead skin may be rubbed off or torn away by the patient, and the epidermis in this way may be irregularly stripped off for some distance about the nail. The new epidermis underneath becomes thickened and hard, and is in its turn shed or torn away. The diseased skin about the nail thus becomes scaly and ragged in appearance. As a result of injury, the outer margin of the furrows about the nail may become fissured, and these cracks are sometimes very painful. In old cases excoriations and fissures may occur in the skin about the nail, which is rendered thereby sensitive to pressure. The entire dorsal surface of the last phalanx is sometimes involved in this process. The thickening of the epidermis is always most marked at the margin of the nail groove. This form of paronychia most commonly occurs about the finger nails. All the fingers may be simultaneously or successively involved. In the majority of cases several fingers are involved successively, and show different stages in the progress of the disease. The lesions are always chronic and indolent; the inflammatory symptoms are very slight. This form of paronychia usually occurs during the first year, and belongs, like the other varieties, among the secondary manifestations of syphilis. It may occur later, but is rarely met with after the middle of the second year of the disease. It occurs more frequently in pa-

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Syphilitic paronychia is a manifestation of secondary syphilis. It occurs during the first and second years after the appearance of the chancre. It is most often met with between the seventh and twelfth months, but may occur earlier. The prognosis is always favorable, excepting in the severe forms of ulcerative paronychia, and, unless the matrix and nail-bed have been destroyed by ulceration, the reproduction of a new nail may be confidently expected. Where the ulceration is extensive a very doubtful prognosis as to the ultimate reproduction of the nail should be given.

Diagnosis.—The dry forms of syphilitic paronychia are not likely to be mistaken for nonsyphilitic paronychia. In doubtful cases the history of the lesion and the presence or absence of other manifestations of syphilis should be considered.

True inflammatory syphilitic paronychia is characterized by its very chronic course, the absence of all tendency to suppuration, and the hard and painless character of the lesion unless irritated. In the ulcerative form of paronychia the lesion may be mistaken for that of the ingrowing nail, especially when the nail of the great toe alone is involved. In syphilitic paronychia the lesion begins as a dusky-red papule upon the border of the nail-groove, or over the matrix, and the ulceration which occurs is secondary, being due to traumatic causes.

Ulcerative syphilitic paronychia. In strumous individuals, or in those who are susceptible to septic infection, and especially in diabetic subjects, there may occur an ulcerative paronychia, or paronychia maligna, which resembles that of syphilis. In many cases this affection is really a tuberculous infection of the matrix or nail-bed. In the absence of any of the symptoms of syphilis, the diagnosis is often difficult, and treatment can alone decide the character of the lesion. In ordinary whitlow the inflammatory symptoms are usually more acute than in syphilis. In most cases, however, a positive diagnosis can not be made without taking into consideration the history of the case, and the presence or absence of other cutaneous lesions which are characteristic.

Treatment.—In the dry form of syphilitic paronychia the local treatment is unimportant. To protect the diseased finger from irritation is all that is required. For this purpose the finger of an old glove may be worn over the nail. In the more advanced forms of dry syphilitic paronychia, where much thickening has taken place, some benefit may be derived from the local use of a mild mercurial ointment. Specific constitutional treatment, however, is necessary for the cure of this lesion, as it is for any of the other cutaneous lesions of syphilis. Mercury—and not the iodides—is indicated in all cases. As the dry form of paronychia frequently occurs in those who are gouty or lithæmic, it is important to prevent in such cases, by appropriate treatment, the excessive formation of uric acid.

The treatment of the inflammatory and ulcerative varieties of syphilitic paronychia should be both local and constitutional. In the inflammatory type the specific treatment is the same as for all secondary manifestations of the disease. The ulcerative type being true gummata of the matrix, the iodides are indicated. The judicious administration of a mixed treatment, with the iodides "in excess," should be carried out. The local treatment should be conducted upon general surgical principles.

The fact should not be lost sight of, that in ulcerative syphilitic paronychia the loss of the nail is always to be expected. It is, I believe, a wise precaution to remove the nail early in the course of the disease, as it is a very fruitful source of irritation.

Syphilitic Onychia.—The lesions of syphilitic onychia are never inflammatory. The changes that occur in the nails are due to the action of the syphilitic poison upon their nutrition. There are four different varieties of syphilitic onychia. Describing these according to the principal anatomical change which occurs in each, we have:

1. The form in which the nail becomes broken or cracked along its free border (*onyxis craquelé* of Fournier).
2. That form in which the nail is *partially* detached.
3. That form in which the nail is *entirely* shed.
4. Hypertrophic onychia.

The clinical aspect and the nature of the lesions are essentially different in each of these types, and in cases of the same type the symptoms vary in their intensity.

1. The *first variety*, namely, *onyxis craquelé*, is by far the most common. It occurs in a mild and in a severe form. In its mildest form it is analogous to the condition of the hair produced in secondary syphilis, which precedes alopecia. The affected nail loses its luster, looks dull, assumes a yellowish tinge, and has an abnormal number of *flores unguum*. It becomes brittle and breaks easily along the edge. Such a condition is not very uncommon when the secondary eruption has been intense. Bergh does not seem to regard this mild form as especially characteristic of syphilis; and the same condition, or at least a similar one, sometimes occurs in other chronic diseases which interfere with the general nutrition. In the typical form of this variety of onychia the

above symptoms are present, and in addition the nail is marked by parallel lines and ridges. Its free edge, usually most apparent at the corner of the nail, thickens and becomes of a dirty yellow or yellowish-white color. This thickened portion of the nail is friable and brittle; it cracks and breaks easily, leaving the edge of the nail irregular. The whole outer border of the nail may be affected in this way, or the corner only may be thickened. Owing to this dryness and brittleness of the nail and its tendency to crack and fissure easily, pieces are broken off, and sometimes a portion of the nail-bed is exposed. This form of onychia may be and often is associated with one of the forms of dry paronychia. After a time a normal nail is reproduced. The nail shows no tendency to exfoliate. Fournier thinks that this form of onychia is much more common in women than in men. The course of the lesions is very slow and chronic; the disease may continue for weeks, and has a tendency to relapse. A number of nails are usually affected.

2. The *second form* of syphilitic onychia is not, I believe, as uncommon as some authors seem to think. It is fully described by Fournier, but is not mentioned by many of the best medical writers. It occurs more frequently upon the fingers than upon the toes. It is met with in both sexes. The course of the disease is very insidious, and frequently the lesion may escape the attention of the surgeon and even of the patient until separation of the nail is far advanced. The lesion belongs to the secondary manifestations of the disease, and most frequently occurs during the sixth or seventh month after the chancre. It is not accompanied by any pain. The lesion consists in a separation of the nail from the nail-bed and matrix. The separation begins at the distal extremity of the nail, where the latter is attached to the nail-bed. From this point more or less of the nail becomes detached from the nail-bed. This separation is in most cases uniform, the nail being loosened across its entire width. The separated portion of the nail becomes discolored, and a dirty, yellowish-white tint. A white line extending across the nail marks the separation between the detached and the adhesive portions. This is especially noticeable when the end of the finger is pressed away from the nail. The extent to which the nail is detached can be ascertained by passing a probe down underneath it. In mild cases not more than one half the nail is detached, but very rarely the nail may become separated from its bed and from the matrix and fall off, leaving the nail-bed bare. In many cases pieces of the loosened part of the nail may be broken off. This may occur at the end or at the side of the nail. A portion of the nail-bed may be thus exposed, and this becomes covered with a more or less thickened epidermic layer. The reparative process is always slow; but no matter how extensive the disease, restoration of the nail is perfect. The diseased nail, as it grows upward, can be cut off, and the new nail

growing up from the matrix gradually becomes more and more attached to the nail-bed, until finally the nail becomes again firmly adherent throughout its entire length.

This form of onychia may involve a single nail, but the lesion is usually multiple, several nails being successively involved. The degree of separation is not, as a rule, the same in all the affected nails. The nails upon the thumbs and upon the great toes are usually affected, the lesions being most marked in these situations. The course of the disease is very slow even under treatment, the lesions in some cases remain for months, and it always requires several weeks for the normal condition of the nail to be restored. The prognosis is always favorable, and a normal nail may be confidently expected in the most severe cases.

3. In the *third variety* of syphilitic onychia the lesions begin insidiously, and, when the toe nails are affected, may be unnoticed by the patient until they are far advanced. The finger nails, however, are much more often involved than are those of the toes. There are two varieties of this form of onychia. In one, the affected nail becomes thinned behind the lunula, the upper lamella being absent. As the nail grows forward the line between the old portion of the nail and the new diseased portion is marked by an irregularly curved ridge formed by the base of the old nail. The diseased portion of the nail is marked by longitudinal ridges which have a tendency to converge toward the outer end. The nail loses its luster, looks dull, its surface is more or less irregular and discolored. The diseased portion is very thin and the lunula is absent. The upper lamella at the base of the old portion of the nail splits and cracks, leaving between the two portions of the nail an irregular and rough ridge. After a time the old portion of the nail becomes loose and is wholly or in part cast off, leaving a portion of the nail-bed exposed. In the other and more typical variety of this type of onychia the growth of the nail may be completely arrested. The old nail attached to the nail-bed continues to grow forward, leaving bare the nail-bed between its lower border and the matrix. The base of the old nail, as it grows forward, is cracked, broken, and irregular. The nail itself is discolored and marked by longitudinal ridges. Finally, the nail becomes loosened and falls off, leaving the entire nail-bed bare. The latter becomes covered by a moderately thick epidermis. Unless the matrix or nail-bed be accidentally injured after the nail has been shed, a new nail, under appropriate treatment, is reproduced. This at first may be deformed and distorted, but in all cases is ultimately replaced by a nail of normal appearance. The course of the lesions in this type of onychia is very slow; there is no pain and no inflammation. The lesions are most marked upon the thumbs in the cases I have seen. The lesions may be greatly modified by treatment.

4. *Hypertrophic Onychia.*—This is the rarest form of syphilitic onychia, and yet it has been described by more writers than either the second or the third form. Jullien does not seem to consider it a more uncommon lesion than are the other forms of onychia. This I believe to be an error on his part.

In hypertrophic onychia, as the term implies, the entire nail becomes enormously thickened. Its surface is dry and uneven, and the upper lamella becomes cracked and split. The nail is of a yellowish or whitish-yellow color, and in the furrows which form upon its surface dirt is likely to collect, giving to the nail a very unsightly appearance. The nail is usually thicker at its free margin than it is at its base. The course of the disease is chronic; the diseased nail is ultimately replaced by a new growth, and the nail finally assumes a normal appearance. One or more nails may be involved.

Other Varieties.—Dr. R. W. Taylor has described another variety of syphilitic onychia. The nails affected become dull and opaque. A number of small depressions appear upon the surface, quite uniform in size, being about as big as the head of a pin. The sides of these depressions are sharply cut. These increase in depth, and may involve the entire thickness of the nail, or only the upper lamella may be affected. The surface of the nail is quite uneven, and resembles the outer surface of a thimble. The number of depressions upon each nail varies from two to twenty. Dr. Taylor does not describe the process of repair, and has only seen two cases of this form of onychia.

Mr. Hutchinson describes the case of a woman, sixty-four years of age, who had contracted syphilis from her second husband. When seen for the first time by Mr. Hutchinson she was being treated for a double syphilitic iritis. The nails upon her right hand and right foot were diseased. He describes this as "a splitting up of the superficial lamella, leaving the nail in a ragged, broken condition, and much discolored. The nails showed no tendency to exfoliation." Upon the same hand and foot there was a copious syphilitic psoriasis. An illustration given of one of the affected fingers shows that this was not a form of hypertrophic onychia, nor of the *onyxis craquelé* of Fournier. It might be more properly classed under the first variety of the third type described above.

Mr. Hutchinson also describes a thinning and partial exfoliation of the nail as occurring late in hereditary syphilis associated with keratitis, deafness, and nodes.

All these forms of syphilitic onychia belong among the secondary manifestations of the disease. They usually occur during the first year or eighteen months after the chancre. The nails of the toes are said by many authors to be more frequently affected than those of the fingers. My own observation, however, has led me to the opposite conclusion.

The toe nails or the finger nails may be affected alone or together. The lesions are not symmetrical. Usually several nails are diseased simultaneously or in rapid succession. The form of onychia is usually the same in all the nails diseased. The intensity of the lesions varies in different nails. Different forms of syphilitic onychia may affect different nails in the same patient, but this I believe is exceedingly uncommon. All the forms of syphilitic onychia may be associated with paronychia, but this I believe to be very exceptional. All the forms of syphilitic onychia are extremely chronic, usually lasting for many months unless checked by treatment at the outset. They are all painless affections.

Syphilitic onychia has been said to occur more commonly in cases in which the secondary skin eruptions have been intense. This I believe is by no means always the case. In all forms of syphilitic onychia the prognosis is favorable. Even where the nail is partly or wholly destroyed, a new nail is ultimately reproduced which is normal in appearance.

Diagnosis.—The lesions of syphilitic onychia, when well marked, are not likely to escape notice, but as they are painless they may be overlooked when they are slight, or in patients who are not particular in the care of their hands and feet. The diagnosis in any of the different varieties of syphilitic onychia is usually quite easy, although it can not be made in all cases by simple inspection of the lesions, as similar changes occur in the nails as the result of other chronic diseases which affect the general nutrition. It is necessary, in making a diagnosis, to take into consideration the history of the case, the general condition of the patient, and the presence or absence of other cutaneous lesions which are characteristic. In cases of onychia in which no other cutaneous lesions are present, and in which no history of syphilis can be obtained, the diagnosis should be made by exclusion.

As syphilitic onychia is a manifestation of secondary syphilis, the changes in the nails are usually accompanied by other symptoms of the disease which are characteristic. The changes in the nails which sometimes occur in patients who are recovering from a long and debilitating disease, and those which occur as the result of eczema, psoriasis, or as the result of general constitutional diseases, such as diabetes, should rarely be mistaken for syphilitic onychia, the history of the case and the absence of other symptoms characteristic of syphilis making the diagnosis easy.

Treatment.—The treatment of syphilitic onychia is the same as that for all lesions occurring during the secondary period of the disease. Mercury, and not the iodides, is indicated, and in patients who are anæmic and debilitated the specific measures should be combined with tonics. A gouty or rheumatic tendency should be appropriately treated.

The local treatment consists in protecting the ends of the fingers from injury by covering them with gloves or rubber stalls.

EXPLANATION OF PLATE XVIII.

Fig. 1, ulcerating gumma situated unusually far forward; nonulcerating gumma near border.

Fig. 2, fissure of tongue in young man four months after infection.

Fig. 3, nonspecific leucokeratosis.

Fig. 4, syphilitic leucokeratosis with fissured condition of plaque.

Fig. 5, exfoliatio areata linguæ in girl of four years, resembling syphilis.

Fig. 6, papulo-erosive plaques of unusual number and distribution in syphilitic young man, painted from wax model made from life by Dr. Leviseur.

Fig. 7, under surface of infant tongue showing first stage (*a*) of benign ringworm, and complete rings (*b*), independent of those upon dorsum linguæ.

PLATE XVIII.

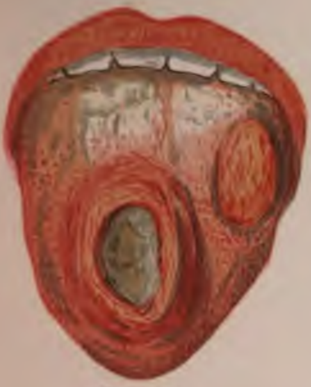


Fig. 1.

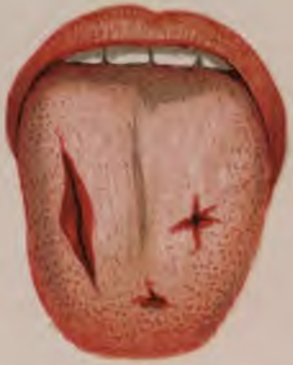


Fig. 2.

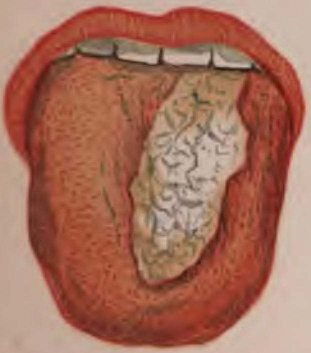


Fig. 3.

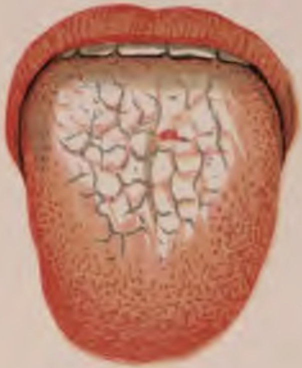


Fig. 4.

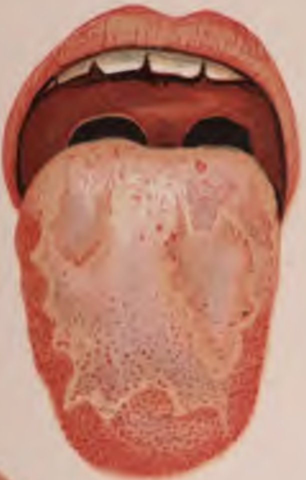


Fig. 5.

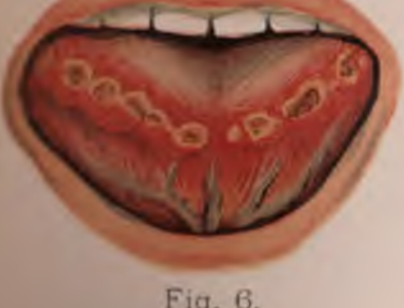


Fig. 6.

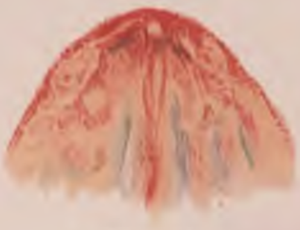


Fig. 7.

SYPHILIS OF THE MUCOUS MEMBRANES OF THE MOUTH AND TONGUE.

BY CHARLES W. ALLEN, M. D.

The pathological changes which occur in syphilis mucosæ oris are of the same general order as those observed in eruptions upon the cutaneous surface, though from the nature of the tissues here implicated the morphology is often quite different, and the chronological order in which the changes take place is by no means so regular as in the skin manifestations.

Mouth lesions receive their great importance from the early period at which they begin to appear, both in hereditary and acquired lues; their decided tendency to recur; the extremely contagious properties which many of them possess; and the facility with which lesions situated in such an exposed part may transmit the infection. From a diagnostic standpoint, too, the mouth becomes a most important region in the study of syphilis, for oftentimes here alone will signs of the disease be discoverable; and in late syphilis, or even years after all other signs may have disappeared, changes in the tongue will indicate that the disease has existed, or the active lesions which may continue to crop out will show that it still exists. From a prophylactic view the fissures and erosions which are situated about the lips and commissures of the newborn, as a positive sign of hereditary syphilis, assume a scarcely-to-be-exaggerated importance, playing as they do the chief *rôle* in the propagation of the disease, and making the question of wet nursing one of great responsibility to the physician.

In the infectious stages of acquired syphilis prophylaxis has more to do with the mouth by far than with any other anatomical region, for it is not only the transfer of the poison directly from the lesion here located, but also indirectly through the medium of the saliva, the mediate as well as the immediate contagion, which has to be guarded against. When the matter of treatment is considered, it is the mucous membrane of the mouth and throat which requires almost constant local attention during the active periods of the disease, and an index of the variety and duration of the general treatment required is oftentimes furnished by the condition of these membranes or the evidences of disease which they show.

PRIMARY SYPHILIS.

The initial lesion is so frequently located in or about the mouth, especially when the disease has been acquired in some nonvenereal manner, that innocent syphilis has of late years attracted much attention. When these accidental infections are added to mouth chancres, not more innocently acquired than are those usually found upon the genitals, the proportion to the sum total would greatly surprise any one not familiar with the question.

Of all extra-genital situations for chancre the mouth region is that most frequently attacked, and the lips are implicated oftener than the parts wholly within the oral cavity. Indeed, chancre of the lip is at least twice as common as chancre of the tongue. The form assumed by the lesion varies with the point at which it develops and with the tissues implicated, and for this reason I will describe the appearances commonly presented in the different parts.

Chancre of the Lip, though usually single, and more commonly seated upon the lower than upon the upper, may be at times double; symmetrical lesions being situated directly opposite one another upon the two lips, or they may be double or even multiple in the sense of appearing as nodular infiltrations and superficial erosions, or even ulcerations at several points upon a single lip.

Multiple points of infection upon the lips appear to be more likely to occur in infants than in adults, and in the former a single lesion in the middle of the upper lip is rather indicative of infection from the breast.

This median localization is not infrequent, owing to the tendency to fissure formation at this point, the poison gaining easy entrance through the accidental cleft. Indeed, any solution of continuity of tissue may determine not only the site of the sore, but the very fact of infection; and so many illustrations of mouth chancre following simple mouth affections are brought to the notice of those having much to do with the disease, that one is constrained to believe that many exposed persons escape because their mucous membranes are in a healthy state. I have seen chancres develop on burns of the free border of the lip from creosote spilled in making application to an aching tooth, and from the accidental touch of a hot curling-iron, and in many instances coming under my notice there has been a history of cracked lips or injury preceding the infecting sore. One patient who became inoculated in an open wound gave her lover also a chancre of the lip by means of a kiss, he having had no noticeable breach of tissue before infection. While habitually rounded, and circumscribed with a buttonlike induration at the base, or, at least, giving the sensation of cardboard firmness to the compressing fingers, the sclerosis may present a diffuse, brawny infiltration implicating almost the entire lip. Induration, while the rule, is not invariably present, or it may be but slightly marked. Oftentimes there is so great a degree of infiltration hardness that the whole affected area will stand out, giving to the lip a peculiar stiff appearance, and there may even be a condition of eversion. In marked contrast to this pronounced form is the simple eroded papule, rare, though possible. The diameter of the nodular chancre does not usually exceed that of a ten-cent piece, the surface is red, and the flattened, exuding or eroded apex becomes covered with a grayish or yellowish layer of detritus, or it may be surmounted by a dirty yellowish or brownish crust. The contiguous portion of the mucous surface of the lip is slightly reddened and infiltrated, but may not be otherwise changed. Sometimes after the chancre has disappeared a mucous plaque will occupy this situation on the inner lip-surface, or a membranous deposit may cover this area as well as the site of the chancre. Instead of this superficial erosion we may have a superficial ulceration, and in one case at least I have seen quite extensive and deep ulceration; but when this occurs one must always think of the possibility of a mixed infection, and the presence of chancroidal virus or some other supergrafted ulcerative process. An ulcerating sore with uneven grayish base and without much induration may be of doubtful significance until the eruption appears.

The Diagnosis in almost all cases is of no great difficulty, and is facilitated by the marked implication of the neighboring glands beneath the jaws and in the region of the throat and neck, causing at times some pain and considerable stiffness. The characteristic picture thus formed is scarcely to be confounded with anything but cancer; and here the lip lesion has come on so gradually and the ganglionic enlargements have been so insidious, never being pronounced till after several months, that even should they reach such a degree of development, the history would at once settle the question. Easy as this differential diagnosis would seem to be, lip chancre has repeatedly been mistaken for cancer, and operated upon. This mistake should not occur, if it is remembered that the cancer almost always comes on the lower lip, is painful, more irregular and ragged, lacks ivory hardness, and is not influenced by treatment.

Chancroid, which is extremely rare, but possible, here and also in other portions of the mouth, as has been shown experimentally, is not indurated and has a more destructive tendency. The comparatively infrequent occurrence of chancroid is accounted for by the number of syphilitic mouth affections which are capable of producing chancre, while the soft sore can alone reproduce its like. Other conditions which might be mistaken for chancre are herpes, traumatism, some of the later forms of syphilis, inflamed fissure in its early stage, and possibly seborrhœal eczema of the free border and mucous membrane in children. Local treatment is best carried out by keeping the region continually covered with a mercurial plaster or spread ointment.

Chancre of the Tongue, which comes next in point of frequency, is almost invariably a single sore situated upon the anterior half of the organ and usually near or upon the tip. It is either an ulcer or an erosion, of oval or rounded form, with induration marked only when the tip is the part involved. Though at times deeply seated in the tissues, and capable of leaving extensive fissures behind, the ulcer is more often superficial, and of small diameter. Still, in infants the whole tip may be involved. The under surface of the tongue alongside the frænum or near the border may be the site of an erosion or ulcer, showing some induration at the base. In this location the lesion may be elevated above the surface and undergo very slight ulceration. The borders of the ulcer are not characteristic, but usually slope gently inward to the base in the scooped-out or crater-shaped variety, while in the smooth, flat ulcerations and erosions, with even rosy or perhaps opaline base, the coloring shades off so gradually into the surrounding tissues that a border can scarcely be spoken of.

The adenopathy accompanying tongue chancre is extensive and firm, or of cartilaginous hardness, the subhyoid and submaxillary glands being chiefly involved.

Men are said to be more subject than women to primary tongue syphilis. The statement is one which I am not prepared to confirm, and know of no good reason for woman's decreased liability.

Diagnosis.—It is important to distinguish this from the ulcer of tuberculosis, which, however, is more painful, has less induration, shows more irregularity in outline and base, is often studded with fine granulations springing through a pink, yellowish, or grayish-yellow floor, and may present the miliary yellow points which Trélat has shown to be tubercles in course of development. Again, the microscope might show bacilli, and the ulcer would persist in spite of mercurials. Rapidity of development and extension speak, too, in favor of chancre. Ulcerating gumma or other later manifestation must be carefully excluded, and the dental node and simple ulcer kept in mind, as well as the fact that cancer more often occupies the borders farther back.

Treatment.—Frequent antiseptic mouth baths, containing boric acid, carbolic or bichloride, and occasional weak applications of chromic acid or nitrate of silver. Under the use of mercurials, locally as well as internally, the improvement is rapid.

Chancre of the Gingivo-labial Fold is not much less frequent in infancy than that of the tongue; and

Chancre of the Gum has been occasionally reported. The general characters are much the same in these situations as those already described.

Chancre of the Soft Palate is usually a flat, circular, slightly elevated infiltration, whose surface is either deep red or grayish. The diameter rarely exceeds one and a half centimetre, and the whole appearance may be much that of an infiltrated mucous plaque. Characteristic induration of the base may be made out by grasping the infiltration between a finger passed behind the palate and the thumb, but absence of hardness does not invalidate the diagnosis.

The glands beneath the angle of the jaw are most likely to be enlarged, and there may be considerable pain in the parts. As a rule, in mouth chancre the nearer the isthmus of the fauces is approached the greater will be the discomfort occasioned by it, pain being especially complained of during the act of swallowing.

Chancre of the Mucous Membrane of the Cheek has been observed, but it is very rare.

EARLY CONSECUTIVE SYPHILIS.

Even before the infecting primary sign of syphilis has had time to disappear, evidences of constitutional poisoning begin to show themselves upon the mucous membranes of the mouth, and, if the chancre has been here situated, it may undergo a gradual transformation into what is generally known as a mucous plaque. The mouth thus shows a tendency to early eruptions equal to or exceeding that of the skin, and the proneness of certain of them to recur far exceeds any similar tendency shown by the cutaneous system. The forms under which consecutive mucous manifestations appear are practically the same as those found upon the integument, but by reason of the greater delicacy of the tissues, the constant heat and moisture with which they are surrounded, the more rapid removal of superficial epithelial structures, and the greater vascular supply, they assume features not possessed by skin lesions.

A practical division is into two distinct groups—moist, and dry or scaly lesions; while it must be borne in mind that the mucous plaque, which in its manifold variety constitutes the first group, is only a modification of a macular, a papular, or a tubercular eruption occurring in the mouth. In addition to these forms there is an erythema, a pustular syphilide, and an ulceration, which belong to the moist lesions of this early consecutive stage.

In the dry or scaly group we have several distinct conditions which have been the cause of much confusion, and are to-day often confounded with nonsyphilitic affections. A faulty nomenclature, and an apparent forgetfulness of the fact that syphilitics are not exempt from smoker's patches and other leucomas, have had much to do with the seeming difficulties surrounding the study of this group.

Erythema occurs especially upon the posterior boundaries of the oral cavity coincidentally with roseola of the general surface, or even before it. While usually assuming the form of a diffuse hyperæmia of dark red color, with an outline sharply defined, either upon the soft or at its junction with the hard palate or upon the pillars of the fauces, and perhaps implicating the uvula, we may find circumscribed, rounded, red spots, which become confluent within a day, forming patches with sinuous convex outline; and it is this well-defined outer margin, often showing the patch to be made up of separate smaller macules, which alone, in the absence of ulceration, serves to distinguish this from a simple catarrhal hyperæmia. In addition to these two varieties there may be a scattered punctate eruption over the vault and possibly the cheek surfaces, and in the latter situation, as well as upon the lips, one may sometimes see small congestive areas during the period of active cutaneous exanthemata. A well-defined sparse macular eruption corresponding to the roseola on the skin, and disappearing without undergoing other change, is probably never observed. From the delicate nature of the epithelium it readily suffers injury, and the red spot or area takes on a light gray color, the epithelium is raised up and becomes detached, and we have before us the

Erythemato-erosive Syphilide, which may leave denuded areas of irregular size and contour upon the hard or soft palate, the pillars of the palate or other part. The eroded areas become coated with a pellicle made up of cast-off epithelium and detritus, and this in turn is rubbed off by the movements incidental to eating, etc. If any decided irritation takes place, a superficial ulceration may result. Much more frequently the erythematous area becomes the seat of a mucous plaque, and many of the latter have their origin in a rounded hyperæmic spot, which perhaps may be somewhat raised above the surface by reason of cellular infiltration. Submucous œdema may attend an erythema of the mouth, but is more often present in the throat. In this as well as in other early mouth changes a generalized stomatitis with increased salivary and other secretion, due, perhaps, to reflex irritation, is often noticed. I have but recently seen a woman who had as yet received no treatment, but whose mouth and throat were covered with mucous patches, present almost as much ptyalism as if her gums had been "touched" with mercury.

Diagnosis from simple catarrhal angina is often impossible when the hyperæmia extends backward into the throat, as it usually does. An eruption upon the body coinciding with or coming on shortly after its appearance will confirm what must in some cases be only a suspicion. Perhaps a bluish-red color of the hyperæmia may occasionally strengthen the suspicion of syphilis, while its appearance at the junction of the soft and hard palates argues in favor of the same view.

Treatment is carried out by antiseptic and astringent collutoria and internal medication begun when the diagnosis is established.

The Papular Syphilide can scarcely be said to exist in the mouth in its pure type, but instead we find the modified papulo-erosive, papulo-hypertrophic, and papulo-ulcerative forms. That these are but modifications of the skin papule, is well illustrated by the facility with which papules upon the delicate skin of infants, and wherever they are subjected to heat, moisture, and irritation in the adult, take on moist, diphtheroid, erosive, and even superficially ulcerative characters. These lesions, which are the most numerous, and the most important by reason of their contagious properties, are so well known by the name of

Mucous Plaques that we will consider their various features under this heading. As we saw in studying the chancre, a mucous plaque can succeed it directly, the one passing into the other; and if this change takes place in a primary sore on the lip, for example, the plaque which forms will be moist and of a grayish or opaline color on the inner surface of the lip, looking as though a stick of nitrate of silver had been lightly passed over the area, while on the free border the surface may be dry and covered with a crust. The first evidence of the plaque generally is a rounded and reddened spot anywhere upon the buccal membrane, and may be single, or more commonly multiple. Though usually more or less regularly circular in outline, it may be oval and at times irregular. It is either flat, smooth, and even with the surrounding surface, or more commonly, and especially in the papular form, raised above the level. On the tongue this erythematous stage may go no farther, and the lesion remains as a smooth area seemingly depressed; the surrounding papillæ causing by contrast the deceptive appearance.

The changes which have till now taken place are of inflammatory nature, with vascular dilatation, embryonic cell infiltration, and serous exudation. Now the serum which is squeezed out is loaded with young cells, and it is to their deposit upon the surface that the opaline appearance is due, and which has led French observers to give us the name *plaques opalines.* This term has, however, been equally applied to certain dry or scaly forms; hence it will be well, in employing it in this connection, to speak of the moist opaline plaque. Two lesions are often symmetrically located, or one upon the tongue will have its mate at a point of the cheek just opposite, and one on the tip of the tongue will correspond to another upon the gum or lip. While this would suggest auto-inoculation, the true explanation is probably to be found in the contact irritation, since it is a common observation that the plaque is very likely to form where a rough tooth impinges upon the cheek or tongue; in the angle of the jaws where the last molar makes pressure upon the gum tissues; in the commissure of the lips upon the side where the pipe is held; and upon that portion of the dorsum linguæ where the end of the stem, or the heat of the smoke passing through it, keeps up an irritant action, as well as upon the site of other lesions which have preceded or are still in existence. For this reason mucous plaques are frequent upon the lips, at the commissures, upon the tip and margins of the tongue, and upon the pillars of the fauces. The usually isolated plaques may exist in groups and become confluent, in which case the outline is crescentic or wavy.

The papular type produced by small-celled infiltration of the papillary body and increase in the mucous papillæ, giving us the *moist papule*, rarely remains unchanged, as we have already stated; but, while capable of disappearing spontaneously, much more commonly becomes covered over with a whitish or grayish film, or false membrane, constituting the *croupous* or *diphtheroid* variety. This transformation is accomplished when the serous exudate from the papule, or plaque, contains an abundance of fibrin, which becomes deposited along with the cast-off cells upon the surface. Some patients show a much greater tendency to this pseudomembranous formation than others. Now, when this pellicle exfoliates or is rubbed off, or the skim-milk-like coating of the opaline plaque is cast off, along with the uppermost layer of epithelium, we have presented to us the most frequent form of all—the

Papulo-erosive plaque, which is recognized by the varnishedlike surface of the rete mucosum laid bare, presenting a sharply circumscribed infiltration, with a moist, shining, bright or brownish red surface, shown in a somewhat unusual number and distribution (Plate XVIII, Fig. 6). This becomes quickly covered over again with a membranous deposit, showing perhaps under the microscope a few pus-cells, and this process of exfoliation and production keeps up for some time. On the other hand, an interstitial hyperplasia may take place, or the round-celled infiltration may continue as a chronic process, the papillæ elongating, the epidermic layers remaining unshed, and the superficial epidermis showing considerable thickening as well as the rete mucosum, the whole process constituting what is termed the

Papulo-hypertrophic plaque. This exists, for the most part, upon the tongue, and especially upon its under surface, where an exuberance of development is favored by the protected situation and more constant moist heat. It is seen, too, on the lip, the vault of the palate, the soft palate, the uvula, etc. The surface of this elevated plaque, which may be half a centimetre or even more in diameter, showing a decided tendency to spread at the periphery, is irregular from the unequal length of the elongated papillæ forming it, and may be either covered with the diphtheroid layer or show erosion. In the angle of the mouth this form may spread to the surrounding skin surface, and while the mucous portion is covered with a grayish membrane the outer parts will be crusted over with a dry, brownish-yellow deposit. Here especially are the plaques complicated by fissures and rhagades, and if these pass completely through the infiltrated area they not only occasion much pain and annoyance, but can bring about submucous or subcutaneous connective-tissue changes, followed by suppuration and lymphangitis.

When the elongated papillæ become separated into small groups, papillomatous, *vegetating*, or *cauliflower* forms occur. These only differ from the simple hypertrophies in the division into separate nodules or segmentation of the patch, each becoming separately covered with epithelium, and the whole producing—on the dorsum of the tongue, for example—what the French have described as toad's-back appearance, especially when a number of papular lesions have become agminated and separated by furrows and fissures.

Besides the elongated thinned papillæ of the derma, showing the small, round-celled infiltration which latter proceeds from the vessels, Finger (Die Syphilis und die ven. Krank., 1892) says the microscope shows endovascular changes almost causing obliteration, and pluglike prolongations of the rete between the papillary bodies. The cells are swollen, and the nuclei show several nucleoli. Between the rete cells are found small cells with large nuclei. Even in place of many of the rete cells, corresponding in size to them, and evidently formed by endogenous production, are nests of small cells, often lying close together inside of the still recognizable contour of the former rete cell. These hypertrophic plaques show an inherent tendency to spontaneous resorption, but this may in particular instances be only partial, and a hard infiltration going over into connective tissue, and becoming covered with epithelium, may be left behind until treatment is instituted.

Papulo-ulcerative plaques form where any irritant, such as a decayed tooth, has produced its effect upon an eroded, luxuriating, or resolving papule, or where uncleanliness, the use of tobacco, etc., has been at fault, or where the patient injures the patch in scraping the tongue. The ulcer is superficial and painful either because the same irritations which determined its existence are kept up, or the condiments in food and the movements in eating keep it inflamed.

Diagnosis.—The ulcer is below the level and has a yellow base, but possesses no especially marked features by which a positive diagnosis can be made. It closely simulates the simple, herpetic, and aphthous ulcers; but if the papule has been observed before ulceration began, this is an almost positive evidence of its specific nature, for other ulcers do not begin in this way. The ulcerated mucous plaque in the labial commissure is usually accompanied by a deep and painful fissure, perhaps extending for some distance inside the mouth, and this is kept up by the constant stretching and injury inflicted in opening and closing the mouth. Unless the ulceration has extended deeply into the tissues, healing takes place without cicatrix being left; but where, for instance, a jagged tooth has kept open an ulcer of the tongue, a scar may result.

The Diagnosis of mucous plaques is not difficult, for, although they present so many different features and have none which can properly be called characteristic, still attentive observation over a limited period will disclose changes which other diseases do not present. One of the chief points of distinction between this and lesions similar in general appearance is the absence of surrounding inflammatory zone, and even this sign fails in irritated and exulcerating plaques. When several plaques have coalesced upon the tongue, forming an irregular area with polycyclic margin, there is an affection especially seen in infants and children, though in adults too, at times, with which there could be confusion. I refer to *exfoliatio areata linguæ*, a condition which has received many different names, and which Parrot maintained till the last was a sign of hereditary syphilis. When we come to speak of inherited syphilis I will refer again to this affection, which is undoubtedly not specific, and which would be mistaken for mucous plaques only on superficial examination. It presents at its very beginning a rounded, yellowish-white, raised patch (Plate XVIII, Fig. 7, a), which exfoliates on one side as far as the center, spreading in the opposite direction, and leaving a denuded surface behind, which is smooth and somewhat redder just within the ring segment. A number of broken rings may festoon the margin of the tongue, or, running into each other, produce irregular figures or geographical outlines (Fig. 5); but as these are constantly changing their position and shape, a few days' watching will convince a careful observer that he is not dealing with mucous plaques which have coalesced. Probably the most common mistake made is to confound the aphthous ulcer and mucous plaques. There is often little or no distinction to be made between the ordinary *canker sore* and an exulcerating papule, and concomitant evidence must be relied upon. The patient may, however, state that the small, rounded ulcer is quite tender, whereas the specific lesion is often not complained of, and the nonulcerating papule is scarcely attended with any subjective sensations. The aphthous sore is for the most part perfectly round, scooped out with a decidedly yellow or golden base and a bright red areola.

Treatment of the appropriate kind is of the utmost importance, because of the exceeding contagiousness of these lesions and the facility with which they are caused to disappear, while misdirected efforts may only serve to aggravate them. Unfortunately, however, they return as readily as they go, and, as we shall see later on, may keep coming occasionally for two or three years. Above all, cleanliness must be insisted upon, for foul secretions and decomposing food particles retained within the mouth may alone cause ulceration of the papules. If mercurials have not already been freely given, a course, preferably by innunction, should be begun at once. If treatment has been pushed, great care must be exercised, and the gums carefully watched, to avoid adding a mercurial ptyalism to that which the lesions themselves may already have occasioned.

If, in spite of general treatment by mercury, associated with cleansing and antiseptic mouth washes, plaques persist and continue to appear, a short course of iodide of potassium may at times be given, with speedily beneficial results. For local applications to each separate plaque the most universally employed agent is the solid stick of nitrate of silver, which is to be lightly brushed over the affected areas. Another caustic which has given me excellent results for many years, often being followed by speedy healing of the plaque, is chromic acid in ten to fifty per cent strength, according to the chronicity and obstinacy of the lesion.

A dilute corrosive sublimate solution is at times useful, and from one to five per mille strength can be employed as a wash or topic. In ulcerated plaques complicated by deep rhagades the same drug can be used as strong as ten or twelve per cent to the sore alone, especially when it has not responded to silver applications.

Chlorate of potash solutions still hold an important place in mouth therapeutics, and permanganate of potash in 1 to 1,000 strength often acts well.

Tubercular Syphilide.—Though authors do not make a separate group for tubercles of the mucous membrane, one often hears *moist tubercle* spoken of as synonymous with mucous plaque, and it seems only proper that we should distinguish the large, flat, condylomatous, or rounded and fissured lesions, especially those which often accompany tubercular and tuberculo-squamous eruptions of the skin, from the smaller papular varieties.

Besides existing on the forward part of the tongue, particularly the under surface, where not subjected to pressure, such hyperplastic forms may occupy the lymphoid region at the base of the tongue. Tubercular eruptions may occupy the vermilion border of the lip and pass over upon the mucous surface in serpiginous outline.

Diagnosis.—Prolonged irritation may maintain a hyperplasia in such a wart-like state that it might readily be mistaken for an epithelioma. It must also be differentiated from late inveterate syphilis of the mouth.

The Pustular Syphilide is another variety which will not be found described in text-books; still, from analogical reasoning, its existence would seem most probable. In variola and varicella we have little, round ulcers upon the tongue, roof of the mouth, and elsewhere, which, though seldom if ever seen in the vesicular or pustular stage, are never doubted to be identical with the manifestations upon the skin.

Finger (Die Syphilis und die vener. Krankh., p. 72, 1892) speaks of a pustular exanthem, of which he has observed two instances, presenting aphthouslike, lentil-sized ulcerations upon the mucous membranes, coinciding with pustular syphilide of the skin.

Diagnosis.—Clinically no distinction is to be made between this and an ulcerating papule. There is the same craterlike excavation, covered with pus secretion, seated upon a brownish-red infiltrated area.

From soft chancre, which it resembles, differentiation is made by the coexisting eruption on the body.

Ulcerating Syphilide, aside from the kind just mentioned, and the breaking-down papule or tubercle as exemplified in the ulcerating mucous plaque already referred to, and which is accidental, there is in this early stage, as in all other stages of syphilis, a possibility of spontaneous ulceration taking place.

In hereditary syphilis there are at times to be observed round, elliptical, or horseshoe-shaped ulcers, which, so far as one can judge, have not developed upon or out of preceding structural changes. In adults who have acquired the disease shallow ulcers are found upon the lips, cheeks, and pillars of the fauces, usually multiple, but sometimes existing as a large, superficially ulcerated area, with irregular borders, especially upon the arch of the palate, and showing red dots of papillary growth pressing through the yellowish or grayish base. The bottom of a fissure upon the tongue or lips often becomes involved in an ulceration process, which is painful, but heals readily when appropriately treated.

An indirect effect of syphilis is seen in the *stomatitis ulcerosa* produced by too rapid pushing of mercurials, especially in patients whose mouth hygiene has been neglected. The ulcer is here most common and most severe in the region of the cheek pressed upon by the molar teeth. It has a dirty-gray, pultaceous base, gives out a foul odor, is very tender, and prevents chewing of food. The borders of the tongue may stand out stiff and waxlike when the organ is protruded, showing an indentation where each separate tooth has pressed, and some or all of these indentations may be the seat of a grayish, indolent ulcer.

Treatment is, of course, diametrically different in these two conditions. In the first, mercury is to be pushed; in the second, not only stopped at once, but means taken to eliminate as rapidly as possible, by hot baths, cathartics, etc., that remaining in the tissues. Locally, however, I have found bichloride of mercury mouth douches of benefit in bringing about antisepsis and hastening a disappearance of the symptoms and healing of the ulcers. This gives force to the theory advanced by Galippe, that we have here a stomatitis of septic origin. Chlorate of potash is a drug justly held in high esteem in this unfortunate and often dangerous complication.

Fissures upon the margins of the tongue, the lips, and especially at the commissures, have already been spoken of as complications of infiltrated patches or mucous plaques. Some of these may become deep ulcerated cracks, prevented from healing by the constant motion to which they are subjected, and those on the lips may extend deeply into either the mucous or the skin surface, and, from occasional hæmorrhage mixed with their secretions, become covered over with dirty, brownish-red crusts. When many fissures exist on the lip and become crusted, considerable deformity may result. Upon the margins of the tongue the perpendicular fissures are frequently the site of narrow, whitish plaques, which recur continually, the membranous deposit dipping down and carpeting the base of the fissure. A number of such threadlike plaques may lie parallel to each other.

Upon the dorsum of the tongue deep clefts may form wherever a small-celled infiltration or smooth plaque has existed, and such fissures may be star-shaped or longitudinal in the axis of the organ, looking as though the tissues had been severed with a knife. The walls lie together, and only disclose the depth of the fissure when separated with the fingers. I have recently seen a young man whose infection dated back four months, and whose tonsils were still covered with mucous patches, who had three such fissures upon the dorsum, one being nearly an inch in length and fully a quarter of an inch deep. They were only painful upon contact with seasoned food, etc. (Plate XVIII, Fig. 2).

Such fissured lesions both upon the tongue and lips may leave permanent scars in healing, which will for all time bear evidence of the disease having existed. Fissures constitute a very frequent sign of syphilis in infancy, and it may be said that the location at the commissures is almost pathognomonic. Careful examination will usually reveal the infiltrated patch through which the crack has taken place. If it extends to the corium it becomes quite painful. Besides silver and chromic acid, may be mentioned corrosive chloride of mercury in ten-per-cent solution as a local caustic.

Dry and Scaly Forms of the Second Group.—Though occurring at times quite early, these epithelial and deeper structural changes show the greatest pertinacity, and may even appear for the first time ten years or more after the infection. While commonly associated with mucous plaques and often wrongly called by the same name, their clinical features are so entirely distinct that they should receive separate consideration. In the second half of the first year or in the second year of syphilis it is at times noticed that the plaques which come on the borders of the tongue, cheeks, or lips, appear smooth, dry, and shiny, are very persistent, and when once got rid of come back very soon in the same place, or near by, and appear to increase in thickness and dryness rather than otherwise. In the intermaxillary portion of the cheek, and especially just within the commissure, a grayish or bluish-white radiating or fan-shaped patch is prone to form and persist as a dry, hard, possibly fissured and ulcerated area. Upon the dorsum of the tongue a smooth plaque of pearly hue or faint bluish-white color will be found, on careful inspection, especially when free from saliva, to be entirely dry and devoid of papillæ. It looks, in fact, as though the given area had been closely shaven, and contrasts in a marked way with the surrounding villous surface—a contrast almost as marked as that of a patch of alopecia areata upon the hairy scalp. This smooth patch does not whiten when a stick of nitrate of silver is passed over it, but has the contrast heightened by the staining of the surrounding papillæ. Chromic acid stains the patch somewhat, but less deeply than it does the neighboring parts. The name proposed by Fournier for this latter condition (*glossite tonsurant*) applies well to the appearances presented. When the color is that of the common opal it is designated *opaline plaque*, and, as we have already said, must be distinguished from the humid plaque which goes by the same name, since the former is often the first stage of a leucokeratosis and may prove most refractory, whereas the latter disappears quickly under treatment. Livid patches upon the tongue devoid of papillæ, becoming ashen or pearl-colored, or bluish-white patches upon the cheeks and lips persisting for months or years, gradually changing their size and seat, and finally, perhaps, getting well of themselves, are found in patients who smoke much—in syphilitics as well as in those who give no history or other evidence of the disease. These are known as *smoker's patches.* Smoking is an undoubted etiological fact of great importance in all the dry forms so far considered, but I have seen them in those who never used tobacco at all, and they are now and then seen in women, though much oftener in men. Such nicotine stomatitis is often aided in its tendency to become chronic and develop into thicker patches by the constant irritation of badly conditioned teeth, and in a number of instances I have found mercurial treatment to act as an irritant, inducing or aggravating such superficial lesions.

The more thickened patches will be spoken of under *leucokeratoses*, but I have included here the more superficial opaline along with the simply smooth red patches because they may occur quite early. The purely specific nature of some plaques is beyond question, and others undoubtedly result from the irritation of tobacco in those whose syphilis predisposes the tissues to such changes, while lesions whose general features are identical may follow the inveterate use of tobacco in persons entirely free from the disease.

Diagnosis rests between the dry patch due wholly to the heat and irritant effect of tobacco smoke, and possibly the rough end of a pipe stem, the moist opaline plaque, the superficial gummous infiltration or sclerous glossitis, the first stages of nonspecific leucoplakia, the confluent form of lichen planus, and *exfoliatio areata linguæ*. In the latter the bald patches are bounded upon one side by a yellowish-white border of thickened epithelium. In lichen planus of the tongue small white papules may become confluent and form plaques of irregular outline which show tendency to erosion.

Affections of the Lingual Tonsil.—The base of the tongue, or that portion lying between the papillæ maximæ and the epiglottic fold, is the least explored region of the mouth, so far as the study of syphilitic changes is concerned. The lymphoid tissue which goes to make up what is now generally called the fourth or lingual tonsil is well known to be subject to hypertrophic enlargement and the seat of new growths. This tissue is very similar to that of the true tonsils, and, as the latter are almost constantly implicated in early syphilis, it is not surprising to find that the lingual tonsil comes in for a share of manifestations—though, judging from the silence of authors, they have often been overlooked. A laryngoscopic mirror is generally necessary for a proper demonstration of this rather inaccessible portion of the tongue. The symptoms which would lead to such exploration are a sensation of foreign body in the throat, causing a hacking cough, and a constant desire to swallow. If not relieved, dyspnœa and asthmatic attacks succeed. There is often pain on deglutition. Examination may reveal mucous plaques, or laterally situated elevated condylomatous or aggregated papular lesions, perhaps separated by furrows, the summit of some being occupied by a grayish ulcer. A soft, spongelike or fungous growth may be present. As predisposing to lesions in this part may be mentioned excessive smoking, the abuse of alcoholics, and long-continued talking or singing in those who have recently contracted syphilis. Hypertrophy of the tongue tonsil has been observed in hereditary syphilis, and appears to be more common in women than in men. If the voice is much used, pain may be added to the above symptoms, as well as voice fatigue.

The Diagnosis is usually to be made by the association with other signs, often with similar changes in other parts of the mouth. Strumous or simple hypertrophy must be excluded, as well as fibrous, cancerous, or other neoplasm.

Treatment by applications of strong iodine or iodo-phenique solutions in glycerin, or those usually employed in mouth syphilis. If marked hypertrophy exists, the snare or galvano-cautery may be required to effect a speedy cure.

Diagnostic Features of the Early Consecutives.—To distinguish the direct results of the syphilitic virus upon the mucosæ from those which follow in its train upon tissues altered or rendered susceptible is not always easy or even possible. To differentiate specific eruptions from innocent affections is likewise often difficult but of the utmost necessity, because of their pronounced contagious properties on the one hand, and on the other the fact that the relapsing forms may be the only lesions present by which a positive diagnosis can be made. The marked disposition on the part of the mucous plaque to recur is one of its chief characteristics, and still this is also a feature of aphthous stomatitis and of herpes, and especially that form described by Fournier as *recurrent herpes of the tongue in syphilitics.* As this often shows itself first long after all evidences of the disease have disappeared, it will be more appropriately discussed later on. Febrile herpes, or zona, would in all likelihood be associated with a vesicular eruption upon the skin surface. The individual lesions are small, and when grouped together form eroded areas, whose polycyclic borders show them to be made up of separate elements much smaller than is the case when plaques become confluent. In other words, the wavy outline of the resulting plaque is composed of arcs of smaller circles.

In *hereditary syphilis* some diagnostic points which may be mentioned are that oral lesions are more common shortly after birth than they are in the later stages. At this early age aphthæ and ulcero-membranous stomatitis are rare, while thrush is of quite common occurrence, especially in debilitated infants. In the latter affection the little, milk-white pseudo-membranous deposits occur in a sparse or confluent distribution over the anterior portion of the tongue, buccal and lip membrane, the tissues of which are inflamed, red, and tender. The deposit may be renewed several times before it finally disappears altogether. If any doubt exists, the microscope will show the characteristic spores and threads.

Aphthous ulcer is seen in older children, and each is surrounded by a bright-red areola. It is more painful than the mucous plaque.

Desquamation of the tongue exists in hereditary just as we have seen that it does in acquired syphilis; but that form of rapidly spreading smooth patch, already referred to as *exfoliatio areata linguæ*, is beyond all question a chronic, benign, nonspecific affair, though figured in Parrot's work (La Syphilis hérédit. et le Rachitism, Paris, 1886, Plate XIV) as typical of syphilis. In over twenty consecutive cases studied by myself I have been unable to find evidences of either hereditary or acquired syphilis. I have also seen the affection many times in the adult, and here, too, I have never found it to be in any way connected with syphilis. To the author whose work I have quoted, and whose hospital courses I followed as a student, must be accorded the credit of sincerity in this as in his other scientific observations; but when one realizes that he looked upon all infants having certain cranial and other bony developments as syphilitic, and believed that rachitis was an outcome of this diathesis, one can readily understand how these wandering-rash tongues had such a faulty interpretation put upon them.

Upon whatever portion of the tongue a new lesion begins in this affection, it runs through the same general course as those which have preceded it. At first a rounded and somewhat elevated membranous patch (Fig. 7, a), never so large as a moist papule, quickly undergoes transformation into a creeping, broken ring, which leaves in its wake a smooth area. The papillæ mediæ are somewhat red just within the concave yellowish white and sometimes quite thick and broad border, and this rosy hue fades off gradually into the purplish red of the older portions of the patch (Fig. 5). Contrary to Parrot's experience, I have repeatedly observed the ring of white to dip down over the tip or margin near the tip, and extend for some distance upon the smooth under surface of the tongue; and I have also observed rings upon the under surface quite independent of those spreading from the dorsum (Fig. 7, b). Such ringed or serpiginous formations naturally suggest syphilis, and it is for this reason that I have gone so much into the details of the condition which many, agreeing with Parrot, look upon as being really of syphilitic nature—a view which I am convinced is entirely erroneous.

Mercurial stomatitis, when arising in the course of treatment for syphilis, will be recognized at once by the physician on the alert for this accidental complication. The increased flow of saliva, tenderness and swelling of the gums, foul breath, thickly coated tongue, enlarged and indented tongue, etc., go to make up an unmistakable picture. When, however, poisoning takes place in some other way, and a gray, sloughing ulcer forms in the mouth, and it is found that the patient has syphilis, the mistake is possible of considering the ulceration of specific nature, and giving a still further quantity of mercury, with easily imagined consequences. Again, ulcerative mucous plaques and ulcerations from mercury may be so blended that one can scarcely say which is which, and where the effect of one poison ends and the other begins. The mercurial ulcer upon the tongue is irregular in outline and superficial, often occupying the parts indented by the teeth. The surroundings are usually red. Sloughing may occur and deep loss of tissue follow. Upon the cheek surfaces, lips, gums, etc., the mercurial ulcer is also irregular, both in extent and depth, and its base usually has a grayish, sloughing aspect.

Mercurial glossitis presents less swelling than acute glossitis, but the surface of the tongue is very apt to show excoriations. No condition of syphilis resembles it at all closely. There is, however, in early syphilis a condition of stomatitis attending the angina and outbreak of mucous plaques, especially when they are extensive, which causes an increased salivary flow, and this becomes intensified by the retention of decomposition products. It may be seen even before any mercury has been given, and must be distinguished from that due to the latter.

The rather characteristic grayish coating of syphilitic processes may at times have to be carefully differentiated from the membranous deposit in *diphtheria*, which is thicker, firmer, of a whitish or dirty-yellow color. Surrounding the patch there is swelling, the tissues are bright red, and forcible removal causes bleeding. It is usually associated with unmistakable throat and constitutional symptoms.

Prophylaxis.—Much may be accomplished in the way of preventing severe and troublesome mouth manifestations of syphilis, and also in guarding against the deleterious effects of the mercury administered by suitable mouth hygiene. The gingivitis, which is the early evidence that treatment may have to be suspended, depends at times upon the presence of alveo-dental tartar, which should be carefully removed before the mercurial course is entered upon. Decayed teeth may furnish the conditions required to cause frequent mouth eruptions. At any rate they favor salivation, and for this reason, if for no other, the teeth should be filled, those too far gone pulled, and all put into the best possible condition at the outset. I have made it a custom at the beginning of treatment to send not only the best classes of my patients to the dentist, but even those who habitually pay but little attention to the condition of their teeth. The dentist must, of course, be notified of the disease, that he may take unusual precautions, and thoroughly disinfect his instruments after use. I am convinced that this, together with subsequent mouth hygiene, minimizes the danger of severe implication of this important region of the body. During the mercurial course the teeth should be well brushed, and the mouth washed out with an antiseptice and possibly astringent solution at least twice each day. Among useful drugs for this purpose may be mentioned corrosive sublimate in from 1 to 1,000 to 1 to 20,000 solution; chlorate of potassium in saturated solution; and in stomatitis this may be given internally in ten-grain doses several times a day, besides being employed frequently as a collutory; permanganate of potassium in 1 to 1,000 or weaker solution; chloride, carbonate, and sulphite of soda, borax, boric acid, and Dobell's solution. In hospital practice I have the patients' mouths douched by an attendant, employing a forcible current and an abundance of the solution. Prophylaxis as it concerns the spread of syphilis from mouth lesions can not be too strongly urged. The frequency with which the disease is contracted in kissing, and from accidental contact with the virus deposited upon table utensils and other articles in common use, is almost sufficient to take syphilis out of the category of venereal diseases. In fact, it is asserted that in some regions of Russia syphilis exists almost wholly as a nonvenereal affection. The physician should never neglect, therefore, to urge upon patients the utmost care in this particular. The public should receive instruction in this matter, and should learn to avoid articles passed from mouth to mouth. Think of the possibilities in the case of mucous plaques in the mouth of a street vender of children's musical balloons and wind instruments! The habit these men have of blowing upon each separate toy before it is sold might be the means of spreading syphilis through a whole community. Literature abounds in instances of infection from pipes, drawing implements, tools, surgical and dental instruments, nursing bottles, and many other accidental causes.

LATE CONSECUTIVE SYPHILIS.

The division into early and late manifestations, I am free to confess, is rather arbitrary, and just where the one ends and the other begins is marked by no sharp line as to time, and by no prominent feature in the nature of the lesions by which the transition can be fixed. There comes a time, however, when the mucous plaques no longer recur with such frequency, and begin more and more to assume the dry form. Infiltration becomes more pronounced in whatever lesions occur, and is often of a decided gummatous nature. True gummata begin to appear and ulcerations become of a deeper and more chronic nature, while that following the breaking down of gumma may prove markedly destructive. The scaly forms now show a much greater degree of keratosis and a corresponding persistency, while sclerosis of tissue of a chronic nature appears.

Mucous plaques, as we have seen, continue to show themselves, but the surmounting pellicle is apt to display more and more thickness, and the tendency to dryness becomes more pronounced. A small white spot upon the tip of the tongue or somewhere on the buccal surface, recurring now and then, or a bald spot on the tongue, may be the only sign to indicate that treatment must be kept up. These later plaques show an inclination to obstinacy, which becomes the more important when it is remembered that they are still contagious until a very late period, and at the end of three years or later may be the means of transmitting the disease.

Treatment is the same as in the earlier stage, but may have to be very energetically carried out by inunctions or injections. In other cases one application of a twenty-five-per-cent chromic acid solution may cause the newly developed "milk-spot" to disappear.

Scaly patches increase in the same ratio in which humid plaques diminish in frequency, and may take on a somewhat circinate or even serpiginous outline.

The dry patch may be the beginning of that very obstinate and many-featured condition next to be described.

Leucokeratoses.—Besides the *leucoma* or smoker's patch, and the *leucoplasia oris* which occurs in those who have never had syphilis, there is a keratosis of the mucous membranes of the mouth which is beyond all question of syphilitic nature. The complexities and confusions which writers on this subject have been led into will be better understood, and the whole question will be in a measure simplified, if the following propositions are kept in mind: 1. That syphilitics are predisposed to the changes induced by smoking, and are more likely to suffer than others from the true smoker's or nicotine plaques. 2. That the use of tobacco predisposes to syphilitic changes of a very similar nature, and which are very difficult to cure so long as the use of tobacco is persisted in. 3. That combinations of two distinct processes or mixed forms may exist. 4. That it is possible for a man who has or who has had syphilis to suffer from a leucoplakia of nonspecific nature.

Leucokeratoses are seen almost exclusively in male patients, and the mixed type is that most often encountered. Indeed, the effects of tobacco and syphilis are so habitually combined that one would be led to look upon smoking as the sole exciting cause, did not an occasional instance present itself in a woman or man who never smoked.

The term *psoriasis*, which is commonly used by German and French writers in describing this condition, I mention only to condemn. It is possible that true psoriasis of the mucous surfaces may occur. I have never seen it. The name should, however, be held in reserve for it, and not be applied to syphilis and other conditions. Even Kaposi (Path. und Ther. der Syph., Stuttgart, 1891, p. 210), who retains this name, found the mouth lesions in patients with psoriasis of the cutaneous surface to be due to previous syphilis, and not to the skin disease, as would at first sight be natural to suppose. Many of the leucoplakias do not at all resemble psoriasis clinically, and pathologically they differ in that the former is a hyperkeratinization, while in the latter a process of dekeratinization goes on (Du Castel, L'Union Médicale, Feb. 11, 1892). Other designations for the same condition are *keratosis*, *opaline plaques*, *milk-spots*, *leucoplakia*, *leucoma*, *leucoplasia oris*, *tylosis*, and *ichthyosis*—the latter being, in my opinion, quite as poor a name as psoriasis. The changes in the epithelium may be of so superficial a nature that only a pearly or opaline discoloration is produced, or there may be so much thickening as to transform the affected region into a dense, leathery patch. We can best consider the condition as it affects different regions separately.

Leucokeratosis Linguæ.—Upon the dorsum, the tip, or the borders of the tongue occur rounded or irregular and sometimes gyrate patches of altered epithelium, which may by confluence cover almost the entire surface. They are at first, or in the mild variety, smooth, flat, shining, and may even appear as dull, rosy spots before marked epithelial change has occurred. As the lesion increases at the periphery the central epithelium may be cast off, leaving inclosed a group of bright-red papillæ, which are swollen and tender, and if much subjected to irritation may become excoriated, bleed readily, form a diphtheroid coating, or ulcerate.

If this course is not pursued, the affection may persist as a slowly thickening and extending bluish-white dry patch, which now and again becomes fissured, and, while it is capable of spontaneous disappearance, is almost invariably persistent in its tenacity, and is cured only after the most energetic measures have been employed, often not giving way to antisyphilitic treatment alone, but requiring local applications and perhaps surgical interference.

The erosion which has resulted from exfoliation of the central portion of a given leucomatous spot may in healing again become opaline, and the center of this newly formed thickening may in turn be shed, giving the appearance of a ring within a ring, or several rings may break into each other, causing gyrate forms. The obstinacy shown by this chronic lesion indicates that the epithelial structures have undergone serious disturbances of nutrition, and this is still further shown by the readiness with which leucoplakia undergoes epitheliomatous degeneration in patients of advanced years, especially if a portion of its surface is constantly irritated, as by a sharp projection on a tooth; indeed, cancer of the tongue is preceded in a large proportion of instances by leucoma in one of its many forms.

Concerning the nature of the condition there is much uncertainty, but it is generally believed to be an epithelial hypertrophy, affecting the superficial layers of the epithelium, perhaps preceded by mild chronic inflammatory changes in the mucous membrane.

When the whole or greater portion of the dorsum is involved, the appearance may be that of a tongue closely shaven of its papillæ and coated with a thin layer of collodion, through whose bluish tinge the red surface beneath is seen. In a more pronounced form the center of the dorsum may look as though a brush covered with white paint had been drawn down over it, leaving the margins and tip free beyond the somewhat irregular outline of the white or yellowish-white plateau. Fissures both longitudinal and transverse are usually found crossing this shield-like coating, and giving rise to pain, especially when spicy food is taken. Such rhagades may penetrate the corium, and bleeding or ulceration may take place (Plate XVIII, Fig. 4).

Diagnosis.—The nonelasticity of the tongue favors such fissure formation and causes some difficulty in movements of the organ, but otherwise there are no subjective symptoms.

It is thought by some that the syphilitic leucoplakia is yellowish white and rather dull in hue compared with the silvery aspect of the nonspecific variety. I can only state that I have seen the condition in syphilitics present a silvery glimmer and tendonlike whiteness, and on the other hand have had a patient undoubtedly not syphilitic in whom a leucoplakia had occupied one lateral half of the dorsum linguæ for many years, the color of which was a dull, yellowish white. A thorough mercurial course, given as a test, had not influenced it in the slightest (Fig. 3).

One of the difficulties of diagnosis is illustrated in a case seen within a few months. The patient was infected twenty-five years ago, and had been a great smoker ever since, consuming at least twenty cigarettes daily. Besides the leucoma present on the buccal surface radiating from the commissure next to be described, the tongue was smooth, and occupied over nearly its entire length by longitudinal streaks of bluish white not quite merging into one another. Near the tip was a stellate cicatrix, the result of previous ulceration. The question which naturally arises in this so frequent class of cases—what part to attribute to the effect of the syphilis whose active symptoms have all long since ceased to appear, and what to the effect of smoking—is one whose solution has not yet been reached. Clinically no distinction can be made between the effects of these two distinct factors acting separately, or, as here was evidently the case, in combination.

Distinction must be made between these opaline plaques which show a decided tendency toward condensation, extension, and transition into chronic keratoses, and those previously described which readily disappear under treatment. Mucous plaques and the idiopathic exfoliatio areata already described will be distinguished by their special feature on attentive observation. Most important is the distinction from nonsyphilitic leucoplakia, which it usually so closely resembles that the history must be taken into account. The latter affection may be said, however, to show more perseverance; less inclination to spread at the periphery, but more to thicken by heaping up of altered epithelium and callous formations; less tendency to desquamation in the central or older parts, with its consequent erosion, ulceration, and new epithelial deposit, and consequently lack of the appearance of concentric rings.

In spite of these more or less constant distinctions, instances will present themselves in which one is unable to make a positive statement. *Prognosis* is unfavorable as to cure in the long-existing pronounced plaques, but fairly good in the superficial forms seen early, where all irritation can be removed, and especially that of tobacco. Prognosis is made especially grave by the tendency in old people to epitheliomatous growths in leucoplakias subjected to accidental or therapeütic injury, as from the application of strong caustics, partial excision, etc.

Leucokeratosis Buccæ is most commonly observed in that portion of the cheek mucous membrane which lies opposite the line of contact of the teeth when the jaws are closed. Beginning at the commissure as an opalescent or skimmed-milk, rounded, radiating, or irregular-shaped plaque, it may increase by the formation of new plaques in the vicinity, or by the original plaque extending at the periphery, until the whole region lying between the separated teeth, as far back as the last molar, is involved. The epithelium appears dull, swollen, soggy, whiter near the center—not smooth and shiny, as a rule, but cut up into quadrilateral squares by diminutive lines and fissures. These may run out in a radiating manner from the angle of the mouth, making a fan-shaped patch, or from the more thickened and whitened center in various directions, causing a cart-wheel appearance—just as in the tongue-plaque the central portion may be accidentally torn away or spontaneously exfoliated, leaving behind a denuded, easily bleeding, tender surface, which sooner or later becomes covered over again as before.

Smoker's patch, as it affects the buccal membrane, has the same location, and the appearances are so much the same in the two conditions that I am unable to point out any particular points of difference. Most syphilitics who acquire this affection smoke, but some have it without smoking. Like keratosis of the tongue, it may degenerate into carcinoma. Anatomically, the inflammatory changes appear to be centered in the mucous corium, and chiefly in the papillary layer. At first there seems to be a hyperæmia and cell infiltration, and Schwimmer has described as the first clinical appearances a hyperæmic, dark-red spot. This initial stage is not usually observed, the first changes noticed being those due to cloudiness and swelling of the proliferated epithelium. Sections extending through the corium in thickened plaques which have existed for some time show cellular infiltration, especially along the course of vessels, increase in the rete cells, with thickening of both rete mucosum and horny layers.

Diagnosis.—A soggy, dull-gray, more or less irregularly distributed coating of thickened epithelium is frequently seen on the mucous surface of the cheek and lips in dyspeptic, anæmic, diabetic, debilitated, alcoholic, and other individuals. From the habit of pressing in the cheek and biting off portions of this macerated tissue, denuded red areas of irregular shape and distribution may appear scattered over the bluish patches. In mercurial stomatitis a leucomatous state of these same regions is sometimes seen. In some smokers there is a continual cloudiness of small areas with casting off of the epithelium. The persistent rubbing of a tooth against the cheek may cause a circumscribed thickening, and a wart-like change may take place from a variety of irritating conditions. All these have nothing in common with the drier, more shiny, opalescent, or silvery changes usually associated in syphilitics with more or less pronounced leucoplakia of the tongue. A mucous plaque spreading out from the commissure which it implicates looks sometimes as though collodion had been painted upon the mucous membrane, which was moist, and had therefore dried on in a partial and irregular manner. In leucoplakia the appearances are such as to suggest that the membrane had been carefully dried before the collodion was applied, and that either several coats had been painted on, one upon the other, or that a thin film of cotton had been interposed between two of the layers.

Treatment.—Few cases will be found susceptible of cure by internal treatment alone, and local applications, excepting mild ones, must be used with care. Mild caustics may do harm by provoking malignant growth of epithelium. If radical measures are undertaken they must be aimed at the thorough destruction of the patches. Excision may leave a cicatrix which will occasion as much inconvenience and deformity as the disease; but at the slightest evidence of epitheliomatous degeneration there should be no hesitancy.

If smoking is wholly given up and other sources of irritation removed, a thorough course of antisyphilitic remedies may succeed, and should always be given a trial before surgical measures; the thermocautery under cocaine, etc., are resorted to. Mild forms are readily influenced by treatment, or may even disappear spontaneously.

Gummata, while comparatively rare, occur in all parts of the mouth cavity. Their development is slow and painless, and their discovery is often as much due to objective evidence as to subjective symptoms. The tongue and palate are more often the seat of this form of syphilis than the lips. In point of size the new growths vary from a pin-head to a grape or olive, and over their surface the mucous membrane usually appears stretched and intensely red. The lesions are scattered, single or multiple, or circumscribed and perhaps confluent, and may originate in the mucous, submucous, muscular, or periosteal tissue. They occur four or five years or more after the infecting sore, but may be earlier in precocious cases. Early ulceration is the rule.

The importance of gumma in this region lies in the fact of its frightfully destructive tendencies, almost equaling in some instances those of malignant disease, and, unless checked before much damage has been done, being but slightly influenced by treatment, while at first they are very amenable.

Gumma of the lips is rare, and so is that of the buccal membrane, but both regions may become involved in the gummous process extending from neighboring parts.

Gingivitis Gummosa has been described with ulceration of the gums around the roots of the teeth, which become loosened. Exuberant granulations of a fungous character surround the base of the teeth and occupy the spaces between them. The gums become undermined, and pressure upon them causes pus to flow out around the teeth, while bleeding occurs at the slightest touch.

The diagnosis is to be made from simple and essential chronic gingivitis, and the generalized mild or severe forms seen in mercurial stomatitis.

Glossitis Gummosa.—The onset of gumma of the tongue often passes without attracting the patient's attention, and when of small size the resulting ulcer may be the first thing noticed. The superficial mucous variety are small, forming little nodosities over the surface like grains of shot. These may attain a French pea or cherry size, project somewhat above the surface, and show considerable firmness. The lesions may assume a curvilinear distribution in their groupings, or two or three may be bunched together. They usually accompany sclerosis of the organ, and readily break down and ulcerate. Submucous and muscular gummata are more common. Here the nodules may reach the size of a pigeon's egg, or even larger dimensions. They are ovoid, painless, usually multiple, though seldom confluent, very firm or hard, break down readily in the central portion, discharging a mucilaginous material through an opening in the mucous membrane, which is at first small, but results in deep, abscesslike ulceration, though rarely in phagedena (Plate XVIII, Fig. 1). In rare instances the tongue is so increased in size that it projects from the mouth, with constant dribbling of saliva. Tongue gumma is a late manifestation, though infiltrated patches of gummous nature may occur in the early months of infection. The resulting ulcer will be considered farther on.

Diagnosis.—The mucous membrane is at first scarcely changed, but becomes violaceous before rupture. When not projecting, the tissues must be pressed between the fingers to show the features of the growth. From chronic abscess it is distinguished by being less clearly defined, less rounded, less movable, and not fluctuating; and from cancer by being multiple, and more centrally located. When single, and situated on the border, carcinoma may have to be excluded by the nature of the ulceration, the benefit following large doses of an iodide, absence of cachexia and pain, and the history of preceding leucoplakia. Cancer is, however, apt to be harder and more circumscribed. Glandular enlargements come on late in cancer; but similar submaxillary swellings are seen in syphilis, and sometimes in those who are not syphilitic. The conditions possibly leading to error are: fibrous tumors, which are harder and more circumscribed; tuberculous and dental nodes; while a foreign body, such as a tooth imbedded in the parenchyma, has been mistaken for gumma. In all doubtful cases, before operation is resorted to a thorough test by treatment should be made.

Gummous Ulceration is by far the most frequent variety of ulcer found in late syphilis of the tongue, and it may result in such loss of tissue from sloughing that marked deformity follows the cicatrizing process. The ulcer of superficially located gummata is shallow, with abrupt perpendicular borders and yellow, uneven base. This ulcer may begin from the surface, and not depend upon preceding softening of the interior of the gumma

When deep gumma softens and breaks on the surface there is usually disclosed through the irregular, jagged, and at first small opening an extensive, dirty, grayish-yellow, pulpy or cheesy mass, somewhat like the core of a boil, mixed with blood and pus, or a mucilaginous fluid escapes. When this mass has been cast off by degrees there remains a crater-formed ulcer, with undermined, indented, or firm, rounded borders.

The ulcer is seated upon infiltrated tissue, and the clifflike sides lead down to a sloughing or lardaceous base. The gummy ulcer may become serpiginous and extend over the base of the tongue, involving the glottis in the œdema which usually surrounds it.

These ulcers give way with surprising rapidity to treatment.

The table on next page will aid in distinguishing the gummous from cancerous and tuberculous ulcerations of the tongue; and while in most cases little difficulty should be experienced, some may tax the physician's diagnostic powers to the utmost.

Gummata of the Hard and Soft Palate are of the same character and have the same insidious beginning as those which have already claimed our attention. Their great importance lies in the destructive course which they pursue, unless promptly checked, causing perforation through the bony walls of the hard and often complete destruction of the soft palate, including the uvula, within a comparatively short space of time. I have seen an opening made in the velum through which the thumb would pass, within a few days of the discovery of the gumma. The process begins as a nodule in the mucous membrane, which softens, breaks, and leaves an ulcer, which may extend and deepen; or the parenchyma is first affected, or more frequently indeed, the process may have a subperiosteal or periosteal origin, or even begin in the nasal fossa and extend toward the mouth through the bone, which softens and is carried away or removed as a sequestrum. The middle line of the hard palate is a favorite seat for an ovoid, tense, elastic, and sometimes painful swelling, which soon softens and ruptures, with subsequent exposure of the bone. Even then it is possible for repair without perforation or any noticeable loss of tissue in the healing, as instanced in a recent personal case. Unless treatment has been begun soon enough, however, we must expect more or less of an opening between the nasal and mouth cavities, with altered voice and difficulties in swallowing. In an exaggerated instance of this unchecked destructive process, for a long time in the City Hos-

GUMMA.	EPITHELIOMA.	TUBERCLE.
Occurs upon the dorsum and far back.	Upon the border.	Upon the tip.
Often multiple.	One-sided. May be on under surface.	Usually single.
Preceding deep node.	Warty growth, or leucoplakia.	No preceding tumor.
Ulcer begins in center of indurated mass.	Is followed by woody hardness.	Begins on surface; little induration.
Increases rapidly.	Less rapidly.	Slowly.
Suppurates like a boil.	Ichorous, foul, bad-appearing ulcer.	Less suppuration.
Excavated.	In relief, on fungoid tumor.	Flat.
Pain only on motion.	Spontaneous and lancinating; otalgia.	Tender.
Borders thin, abrupt; edges undermined.	Thick, spreading, irregular, elevated.	Beveled, jagged.
Base, grayish, adherent mass.	Reddish or yellowish.	Pale, flabby. pinkish, or yellowish.
Surrounding swelling, redness.	Induration.	Minute granulations in surrounding parts undergoing caseous degeneration; points of Trélat.
No bleeding.	Small drops of blood on pressure.	Only when injured.
Glands rarely if ever enlarged.	Enlarged late.	Not infrequently enlarged.
Iodide test positive.	Negative.	Negative.
No cachexia.	Cachexia (late).	None.
Microscope shows infiltration by embryonal cells.	Large and distorted squamous cells; cell nests; ingrowing of interpapillary epithelium.	Leucocytelike infiltration; giant cells; bacilli.
Rarely hereditary.	Heredity frequent.	Family and often personal history of phthisis.
Occurs at any age.	Usually late in life.	Usually early adult life, but may be late.
Cured by drugs.	Not checked or diminished.	If ulcer heals over, it breaks out again.

pital, a young girl had lost almost the entire roof of the mouth, and all the soft parts between the mouth and the throat. The nasal bones and the external nose had been eaten away, so that one looked directly into a huge and hideous cavity. The greater part of the perforation may have been accomplished before any sign is found upon the mucous surface of the mouth. Then attention is directed to the parts by perhaps a burning feeling, or pain on pressure over a given point, and inspection reveals a reddened spot, quite sharply defined and perhaps slightly œdematous. This soon shows a central opening, through which a probe may pass into an extensive cavity. If the soft palate or its pillars are the parts involved, the infiltration which has, as a rule, taken place in the loose connective tissue causes prominence and a livid red hue of the overlying mucous membrane, which soon ruptures, with subjective symptoms of pain and discomfort in swallowing. At first a rounded opening discloses an ulcerating cavity with lardaceous walls and surrounded by œdematous livid tissue, and this usually goes on to complete perforation. Unless checked in this stage the destructive process may advance with alarming rapidity and virulence, melting down all tissues in its invading march. Just as in other regions, the beginning may have been a single or multiple lesions, the latter possibly becoming confluent. A permanent, rounded, punched-out opening may remain, or, if small, the cicatrizing process may have almost closed it up.

Diagnosis.—In the velum, gumma may require observation for a time to make sure that the process is neither lupus, cancer, rhinoscleroma nor lepra.

Treatment.—In all these gummatous processes the first and all-important thing is the free administration of one of the iodides in rapidly increasing dose up to the point of tolerance. If mercury has not previously been given in sufficient quantities, a course can be entered upon at the same time.

Glossitis Indurativa Syphilitica.—Besides the circumscribed gumma of the tongue, already described, there may occur in late syphilis a deposit of numerous small gummata in the muscular substance, giving the appearance of hypertrophy, and also a condition of diffuse infiltration, or hyperplasia of a portion or the whole of the organ, shown by a hardness and an increase in volume, which has also been termed *hypertrophy of the tongue.* There is, however, no true hypertrophy. The interstitial connective tissue is at first infiltrated with cellular-elements, hence the designation *glossitis interstitialis* is more appropriate. The swelling, which is a painless one, may assume such proportions that the tongue is compressed between the teeth and becomes indented by them around the whole margin; or, if the swelling is one-sided, this half of the organ feels firm, and is much fuller and rounder than the opposite side. The voice is altered by the unwieldy organ, making the words sound peculiarly thick.

The onset is quite as insidious as in the gummy node, and in its course of rather slow development occasions but little disturbance. The enlargement may persist for months and then a process of contraction ensue, with gradual decrease in the whole organ or the part, the tissues becoming firm and hard, the surface smooth and devoid of papillæ, while distributed over the dorsum or margins are leucoplakialike patches of thickened epithelium, which exfoliate, leaving reddened areas. In this stage the restricted movements are more noticeable than ever. The whole or a portion of the surface becomes lobulated or divided up by furrows and lines into more or less regular areas, with perhaps here and there clefts of greater or lesser depth, and we have before us the picture, which has been named *glossitis dissecans,* from the dissectedlike state which it suggests. Fournier explains the contraction which succeeds the enlargement by the formation of a fibro-plastic weft which runs through the organized areas of hyperplasia, becomes condensed, and thus strangles the tissues of the tongue, causing atrophy and sclerosis. This author describes a superficial and a deep *glossitis sclerotica ;* the former appearing as isolated or diffuse patches of a deeper red than the normal surface, breaking down with great readiness, producing fissures and ulcers, and leaving behind milk-white areas. The second, or parenchymatous glossitis, corresponds with that which I have described at the beginning of this chapter, and, as we have seen, superficial changes always accompany it. Such a tongue is not at all exempt from gummy formations, and, indeed, small as well as large ulcers which form upon the surface often owe their origin to softened gummata. Ulceration from mechanical causes, pressure of the teeth, retention of irritants in the clefts or furrows, are also not uncommon in this chronically altered tissue; but they heal readily, while the gummous ulcer may produce considerable destruction of tissue and add to the deformity already present, before they have been checked by treatment.

The Diagnosis is to be made between this sclerosis and the submucous sclerosis in advanced stages of superficial leucoplakia, where we find longitudinal whitish bands producing contraction and deformity. In the form of deep, woody induration, and especially when an ulcer exists upon the surface, mistake for cancer is a possibility to be remembered, but the pain is lacking; the ulcer, which dips down into the tissues instead of standing out upon a decided tumor as in cancer, does not bleed as in the latter case; the cachexia is absent, and there may be multiple points of ulceration. Mixed or sclero-gummous forms are not rare. Prognosis is favorable if treatment is entered upon early and suitably pushed. If contraction and deformity have occurred, little can be done.

Treatment.—Here, as in gummy node, iodide of potassium or other salt must be run up to the limit of tolerance. If mercury has been withheld, one should not delay by giving it internally, but the more rapid means of introduction by inunction or the hypodermic method should be employed.

PARASYPHILITIC MANIFESTATIONS.

Some of the epithelial and connective-tissue changes which we have already considered should undoubtedly be looked upon as evidences of syphilis which has existed rather than as indicating the presence of the disease in a still active stage. The obstinacy of many of the leucokeratoses, the slight effect or the noneffect of energetic treatment in these cases as well as in certain scleroses, would lend confirmation to this manner of thinking; and, besides, analogous parasyphilitic conditions are to be found in other regions of the body.

Keratosis, or chronic epithelial stomatitis, with opacity and thickening of the epithelium which has lost much of its vitality, is a condition similar to that in which changes in the skin follow long-continued irritation. The surface of a plaque which may at first have been white and smooth becomes roughened or even warty, fissures occur as a greater degree of hardening takes place, and the whole assumes a more yellowish and duller hue.

Fissures in these persistent plaques, as well as in other deformities of the tongue or lips following syphilis, become sources of great annoyance by reason of the pain from acids and spices, and sometimes from smoking and even talking.

Schwimmer found such painful fissures to be relieved by applying with a brush several times a day: Papayotin, 0·5 to 1·0; distilled water and glycerin, āā 5·0.

The following has also been advised: Phenic acid, 2·50; tincture of iodine and glycerin, āā 12·50.

Cicatrices bear much the same relation to the active stages in which they were formed as do these supra-added manifestations. They are indelible indications that the disease has existed, but give little aid in determining whether it may still exist. The cicatrix after chancre is usually scarcely apparent unless there has been considerable ulceration, but after ulcerating gumma there is either a calluslike hardening, giving a certain stiffness to the tongue—if this is the part affected—or after much destruction about the soft palate, uvula, and pillars, ropelike bands may result in distorting the parts and binding them down in various directions. The uvula is often drawn to one side, and here, as well as in the whole region of the throat, the cicatrix is of a dull white color.

The scar from early fissure is depressed, linear, or stellate as a rule. Where there has been much ulceration it may be of irregularly rounded form and depressed below the surface. Upon the tongue deep fissured scars may remain through life, having the natural color of the tongue tissue, their depth and width only being seen when their walls are separated with the fingers.

The cicatrices of the early ulcerations are rarely deep or extensive, having rather the appearance of lines of milk or silvery whiteness, or smooth, glistening, somewhat depressed scars. Cicatricial perpendicular lines upon the margins, and deep or star-shaped fissures upon the dorsum, are always strong evidence of preceding syphilis, for scarcely any other diseases cause them.

Patches of cicatricial tissue appearing as bluish-white discolorations are distinguished from superficial leucoplakia, which they somewhat resemble by being slightly depressed below the level and in remaining stationary and unchanged.

Recurrent Herpes in syphilitics has received considerable attention at the hands of Prof. Fournier, and as the superficial erosions resemble somewhat mucous plaques of small dimensions and polycyclic outline, it is important that they should be distinguished. They are supposed to be due not only to the irritation of the tissues by preceding outbreaks of syphilis, but to that of tobacco, mercury, etc. Hence, if mistaken for manifestations of syphilis still active, and mercury is given, the condition may only be aggravated.

The erosions of herpes occur in repeated crops upon the borders of the tongue, but also upon the dorsum. They are of short duration, healing of themselves in from eight to fourteen days, but may be kept up by smoking, etc. The color is somewhat red after the grayish epithelium has been shed. When the herpes is in the form of a *bouquet* and the micro-cyclic character of the outline has disappeared, the diagnosis is impossible.

An example under my observation for four years, during which time there were repeated outbreaks, occurred in the person of a young man who had become infected with syphilis four years before I first saw him, and had ceased for some time to show any manifestations of the disease. The eruption appeared principally upon the tip and margins of the tongue, but also at times upon the free and inner surface of the lips. The lesions were small, round, smooth, eroded or exfoliated patches, from a line to two lines or less in diameter, surrounded by a distinct pearly-white ring. This ring was not so broad or thick as that of the ringed wandering rash, nor did it have the yellow hue of the latter. A further distinction was in the fact that the lesions did not spread at the periphery, changing their location and gradually invading the whole dorsum as the marginate exfoliative glossitis, several times spoken of in this chapter, tends to do. Antisyphilitic treatment failed to prevent repeated outbreaks, but the attack itself was usually cut short by attention to diet, mouth hygiene, and the application to the individual denuded spots of a twenty-five to fifty-per-cent solution of chromic acid. For the past two years the patient has been free from the annoying condition and has married—an act which he desired but feared to do so long as the tender spots kept showing themselves, in spite of my assurance that they were not contagious. So far as I could judge in this particular case, they were not due to the direct irritation of mercury, for they would appear when no drug had been given for a long time. Still, there is this to be said, that since treatment has been wholly stopped the attacks have ceased. Recurrent herpes seems to me to depend more upon disordered digestion, and perhaps the reason why it is common in those who have had syphilis is because the treatment they have undergone has tended to derange the stomach's function in a way that is reflected in the region of the mouth.

Ulcerations may occur upon the tongue, lips, or cheeks of old syphilitics which are in themselves nowise specific. This is especially apt to be the case in the sclerosed or otherwise altered tissues of the tongue. They are due to mechanical irritation or injury, or depend upon some accidental or infectious cause. In the same way an ulcer or ulcerating fissure may form in the center of a patch of leucokeratosis upon the tongue or cheek following exfoliation or mechanical removal of a portion of the altered tissue. These ulcers possess no syphilitic qualities, do not heal under specific treatment, and may prove sources of great annoyance to patient and physician.

The simple ulcer in sclerous glossitis, where the tongue is perhaps furrowed, lobulated, and deeply fissured, often begins in one of the crevices, and is due to the irritation caused by retained secretions and food particles which undergo fermentative changes. When having its starting point upon the upper surface it often depends upon the injury inflicted by a carious or faulty tooth. It is important to distinguish this from the gummous ulcer which develops in these same sclerosed tongues, but in the latter there is a surrounding indurated mass which is lacking in the simple ulcer, whose base, too, does not have the dirty yellowish or grayish pulpy appearance of the gummy form. The fissured ulcers are often very painful. Treatment helps show their independence of the syphilitic virus, for they are not influenced by mercury or iodides. If, however, the irritant which has occasioned them can be removed, antisepsis and simple measures will often succeed.

Pemphigus Linguæ is a rare condition, of which I have seen one instance in a patient who had recovered several years before from all active signs of syphilis. Similar to the action of lesions in *herpes récidivant*, the bullæ recurred at intervals upon or near the tip. When seen by me a red, eroded, lentil-sized round lesion marked the spot, which the patient assured me had at first been a bulla filled with a slightly blood-stained fluid. One such lesion left upon the tip a round, grayish patch the size of two pins' heads, which still persists. Hoffmann has observed one such case, but Butlin, in his excellent work on diseases of the tongue (to which I desire to acknowledge my indebtedness in the preparation of this chapter), mentions pemphigus of the tongue only as it occurs in connection with pemphigus of the general surface.

SYPHILIS OF THE JOINTS, MUSCLES, BURSÆ, TENDONS, AND APONEUROSES.

BY FRANK HARTLEY, M. D.

SYPHILIS OF THE JOINTS.

THE *arthropathies* of syphilis have been called to the attention of the profession by Babington, Ricord, and Richet principally, but it was due to Lancereaux (1863) that the syphilitic character and origin of this form of disease was firmly established. He found in the subsynovial and fibrous tissues of the knee-joint well-developed gummata, which he believed to be syphilitic in origin.

Oedmansson established the fact, now fully recognized, that a papillary synovitis, with defects or ulcers in the cartilages of a joint, was of the same nature.

Schüller, Falkson, Landerer, Finger, and Voisin have substantiated Oedmansson's investigations and conclusions by finding the very same conditions.

In all their cases not only a papillary synovitis was present, but in the cartilages of the joints defects were found. These defects were surrounded by a series of elevations. The floor of the defects was depressed, and covered with a striated fibrous tissue which lead directly to gummatous tissue, extending into the articular ends of the bone beneath the cartilage.

If we combine with these later discoveries the cases long since recognized as syphilitic—i. e., the secondary involvement of the joints from gummatous osteomyelitis and gumma in the fibrous tissues about the joint—our knowledge of the pathology can be said to be very complete, though we recognize that our diagnostic powers are yet lacking so far as objective symptoms alone are concerned.

Varieties.—The condition known as *arthralgia*, in which we recognize only a functional disturbance in the joint or joints, is frequently seen as the first symptom of the general systemic involvement, or as a prominent symptom in hereditary syphilis.

In the acquired variety it frequently appears at a period when the cutaneous eruption has not made itself evident. Less frequently it occurs at a time when the eruption is present.

In hereditary syphilis it is often the only evidence of the disease.

It is a simple functional disturbance, so far as one can judge from the objective symptoms, and is "felt" only by the patient. We do not know just what tissue is the seat of the disturbance, as there is no change in the joint appreciable to the surgeon. Often no fever or eruptions accompany this condition. The only tangible symptom is the pain in the joint or joints, which is increased at night. This pain is similar to what we often hear spoken of as growing-pains in the young, and in the older we class as rheumatic pains. These painful sensations are characterized, however, by their increase at night. They continue for a longer or shorter period, and disappear without any apparent cause. They return at irregular intervals, and are rebellious to all forms of treatment excepting the antisyphilitic, which acts upon them immediately.

Acute Polyarticular Serous Synovitis.—In the acquired form of syphilis this is not uncommonly present in the so-called secondary period. As in acute articular rheumatism, several joints are involved, and are the seat of intense pain. At the beginning of the attack several joints are involved. At the end of one week, or at most two weeks, the process results in the resolution in all the joints involved, except in probably a single joint in which the process is slow, and which is likely to become a chronic synovitis.

Objectively the joints are swollen, painful, and attended with a slight degree of local heat. Sometimes there is a redness in the skin over the joints, but this is exceptional. The temperature of the patient is slightly elevated. Within certain limits the bones are freely movable upon each other, producing no pain. The extremes of flexion and extension, however, do cause pain. Fluctuation is present in some joints. The duration of this condition is from one to two weeks, with resolution and a complete return of motion.

In the so-called tertiary stage of acquired syphilis, as well as in hereditary syphilis, three varieties of joint affections exist, which may be considered as epiphenomena of the pre-existing lesions found in the bones or juxta-articular tissues. The first variety occurring in this stage is characterized by distinctive conditions in the synovial membrane and cartilage. In the synovial membrane the lesion consists in a well-marked growth of thick tufts covering the whole surface, and especially well marked at the reflexions of the synovial membrane upon the cartilage. In the subsynovial structures hyperplasia of all its constituent tissues is present, which in the older cases extends to the capsule of the joint and its ligaments, and is interspersed with small gummata. In the cartilage chondral gummata may be present alone, but they are most frequently associated with a gummatous osteomyelitis and papillary synovitis.

This chondral involvement in syphilis is evidenced by a transformation of the cartilage over circumscribed areas into a dense cicatricial tissue, somewhat depressed beneath the level of the surrounding cartilage, and covered and bordered by small tufts. These cartilaginous defects are the evidences of subchondral gummata, which have been replaced by a dense cicatricial tissue. These defects in the cartilages and the papillary synovitis are peculiar to syphilis.

It occurs some years after infection, and may be monarticular or polyarticular.

If the subchondral gummata are alone present, the symptoms point to a hydrops, in which the pain is not severe, though generally increased at night. The swelling of the joint is marked as the fluid within it is large in amount. The skin over the joint is unaltered, and the capsule appears normal. The functions of the joint are in very small degree interfered with. As the disease progresses and the papillary growth upon the synovial membrane is added, the hydrops becomes more persistent, and the change in the synovial membrane is appreciable to the examiner's touch. In the further progress of this condition there are added a hyperplasia of the subsynovial and periarticular connective tissues, with interspersed small gummata, its contraction, and an anchylosis of the joint more or less marked, with a diminution, though not a complete disappearance, of the fluid within it.

The synovitis and arthritis following gummata in the ligaments, capsule, sheaths of tendons, and subcutaneous tissue about the joint, are also seen in the tertiary stage of syphilis. As the gumma approaches the synovial membrane a serous exudation takes place within the joint, with very little observable change in the synovial membrane. In the older cases of this variety the synovitis is distinctly papillary in character, with or without a fibrous hyperplasia of the subsynovial tissues. The exudation within the joint is constant and persistent. When the gumma undergoes coagulation necrosis and liquefaction, and enters the joint, the resulting exudation is sero-purulent, and the synovial membrane and subsynovial tissue are distinctly gummatous. Should the gumma involve the joint, and open externally by a fistulous tract, secondary suppuration may occur.

In cases where an osteomyelitis or periostitis which is syphilitic in character has existed, there is apt to be added, by extension directly through the bones and cartilage, or indirectly through the capsule and ligaments, a syphilitic joint disturbance, which is either a serous synovitis or a papillary synovitis, with or without a hyperplastic growth of the connective tissue in the capsule, interspersed with small gummatous foci. This condition, in addition to the evidences produced by an osteomyelitis and periostitis, gives signs of either a simple hydrops without marked thickening in the synovial membrane, or a hydrops with thickening in the synovial membrane and crepitation, with only slight interference in the motions of the limb. When the hyperplasia is added to the papillary synovitis—i. e., the connective-tissue gummatous growth in the subsynovial tissue and capsule—hydrops, though constant, is not marked, but the normal motions of the joint are interfered with, and a partial anchylosis is present. In the severest cases this interference in motion is complete.

In hereditary syphilis it has been my good fortune to see one case of the rare variety of synovitis which is described as a subacute specific inflammation by Schüller. In the case which I saw the disease was bilateral, and involved the knee-joint of a child three years of age.

It was a subacute inflammation, with only a moderate swelling in the synovial membrane and capsule of the joint. The exudation into the joint was slight in amount. Pain increased at night, was not severe, and the skin over the joint was only slightly reddened. No evidence of any osseous lesion could be obtained. So far as any examination could be carried out, the bones and periosteum, the cartilage and perichondrium of the articulating bones were in all respects normal. Its response to antisyphilitic treatment, and the distinct history of the case (the mother and father had been treated for this disease), leave no doubt as to its true character.

This is the variety in which the synovitis is but an epiphenomenon of the necrotic foci and defects in the cartilage due to gummata, although the epiphyseal cartilage seems to be in no way involved.

More common than the above in hereditary syphilis are those cases which occur as a complication of a gummatous process in the tissues about a joint. Such a process may be primarily situated in the capsule, tendon-sheaths, or aponeurosis covering the joint, or a periostitis and osteomyelitis may involve the joint by direct extension to the soft parts investing the joint. The character of the synovitis is that of a subacute or chronic serous synovitis in the early cases, or of papillary synovitis in the later stage, and sometimes with a marked connective-tissue and gummatous formation in the subsynovial and capsular tissue, producing a more or less marked anchylosis.

The third variety in hereditary syphilis is one in which, following an epiphysary osteomyelitis or periostitis (*sive* perichondritis), a gradual serous exudation takes place within the joint. As the process advances, papillary tufts appear upon the synovial membrane, which are in turn followed by hyperplasia of the subsynovial and capsular tissue. If the osteoperiostitis is followed by a complete separation of the epiphysis, or if the foci of necrosis advance through the cartilage of the joint, the effusion within the joint is puriform in character, and the symptoms become more acute. This variety is always attended with a circumferential swelling or enlargement involving the epiphysis, which is more or less evenly marked upon all sides of the bone. It resembles in appearance somewhat the epiphyseal enlargement in rachitis. At times the resemblance to white swelling is striking in so far as the tumefaction and globular deformation of the joint are concerned. The tumor, however, is caused almost exclusively by the epiphysary periostitis, with the thickening of the synovial membrane and periarticular tissue. There is, in contradistinction to the tumor albus, no œdema, no tendency to inflammatory exacerbations, no excessive limitation in the motion of the joint. Patients with this variety can often walk very well. In rare instances the joints present a chronic hydrops, with epiphysary osteophytic growths very similar to arthritis deformans.

Diagnosis.—The syphilitic arthrites or synovites belong to the late period of syphilis, and occur only rarely in the period of the first eruption or the first recurrent period. They are mostly monarticular, and they involve most frequently the sterno-clavicular and knee joints. Next to these joints, the elbow, wrist, ankle, metatarsal, metacarpal, and interphalangeal joints of the fingers and toes are involved.

Though it occurs more frequently upon one side and in a single joint, it may involve several joints upon the same side. Its course is always subacute or chronic, and the absence of pain to any great extent, and fever, are characteristic. The subjective symptoms are not at all in proportion to the objective local lesions.

Where other evidences of syphilis are present the diagnosis is easy; but if such evidence is not attainable, and the history of an injury is only that of a very slight affair occurring in a well-nourished individual, with local symptoms leading one to make a probable diagnosis, the favorable effect of antisyphilitic treatment, both local and general, will quickly decide a dubious case.

In hereditary syphilis the most marked diagnostic symptoms are:

1. The age, three to twenty-eight years; most frequently between the ages of five and fifteen. 2. Osteoperiostitis, resulting in hyperostosis in the tibia, ulna, radius, humerus, femur, metacarpal, and phalangeal bones. 3. Douleurs osteocopes. 4. Syphilitic habitus.

Prognosis.—The earlier the joint involvement occurs the more favorable will be the chances of recovery. The later they occur the slower they are in their course and the less liable they are to recover. The papillary growths upon the synovial membrane, and the hyperplastic gummatous growth in the periarticular tissue, are not capable of a complete resolution. The same holds good for the defects and scars in the cartilage.

Where a complete destruction of the joint is due to the destruction of the ends of the bones, cartilage, and ligaments, the result of an osteoperiostitis gummosa, the freely movable and useless joint seldom results in anchylosis, under careful antisyphilitic treatment.

MYOSITIS.

It is not improbable that a part of the rheumatic pains which precede or accompany the eruption of a constitutional syphilis depend upon a light and acute *irritative myositis*. This variety resembles closely muscular rheumatism, in that the pain is increased by touch and by motion without any evident abnormality in the muscle. It is indeed difficult to tell how much of this manifestation of pain, which is increased by touch and motion, is dependent upon changes in the muscles, fascia, tendons, bones, or joints in many instances.

As a *chronic interstitial myositis*, syphilis of muscle depends upon a small-celled infiltration arising from the perimysium and extending into and between the muscle bundles. It destroys the muscle bundles by a pressure atrophy, and is transformed into a connective tissue, with the gradual loss of the muscle. It is a diffuse process within the muscle, and is at first generally attended with pain.

It is not infrequently combined with the gumma, so that within the infiltrated muscle small gummatous foci are found. The muscle gradually becomes uneven, shortened, and irregular in contour. The scar tissue left is not so extensive, nor are the deformities so marked, as in the gummatous variety.

Gummatous Myositis.—It may develop as a slowly growing and perfectly painless infiltrate in the muscle, which upon examination may be either soft or gummy where the liquid constituents exceed the cellular, or as a hard nodule or patch where the cells are in abundance. Accompanying these gummatous processes there are usually found more or less extensive inflammatory changes.

Commonly, however, the gumma is of a more rapid growth, and pain is a marked symptom, which is increased by touch and motion. The muscle in all the more rapidly growing gummata is in a state of constant contraction. The growth at first moves with the movements in the muscle. It is more frequently found near the tendon than in the center of the muscle. As it increases in size it becomes softer in consistency, and the muscle assumes a condition of permanent contracture. In favorable cases resolution occurs, and the muscle fibers destroyed are replaced by a connective tissue. The common course, however, is not that of resolution.

The granulation tissue forming the gumma is very perishable and unstable, as it frequently has no well-formed and healthy blood-vessels. These granulomatous masses do not undergo further development. They perish by fatty degeneration and coagulation necrosis, and the cellular inflammatory infiltrate surrounding it is transformed into a connective tissue.

This issue of syphilitic inflammations depends chiefly upon the virus, and in less degree upon the endarteritis which is always present, and in which the lumen of the vessel is narrowed or entirely occluded. It is consequently more often seen that the gummatous myositis advances beyond the muscle and involves the fascia and subcutaneous tissue. It becomes more prominent, softer, and less movable, and finally breaks through the skin, leaving a deep, sinuous ulcer, from which necrotic masses, chiefly fascial, are extruded. After healing, which requires weeks or months, a cicatricial tissue remains, which binds together the muscle, fascia, and skin.

Myositis Ossificans Syphilitica.—In rare instances an ossifying myositis follows a periostitis ossificans. It commences in the attachment of the muscle to the periosteum, and gradually involves the whole muscle. It is sometimes spoken of as a *myositis ossificans progressiva* by those who think it due to a lesion in the central nervous system. A marked case of this variety has been described by C. Hawkins, in which case the pressure of the finger upon the muscle was alone sufficient to cause ossification in the muscle, which under iodide of potassium would disappear.

Atrophy of muscles in syphilis has been ascribed to a syphilitic lesion in the nerves rather than to a lesion within the muscle. The muscles involved in syphilis are the biceps and triceps brachii, cucullaris, pectoralis major, masseter, buccinator, biceps femoris, tibialis posticus, peronei, and the muscles of the tongue and palate. It is rare for these lesions to occur early in the course of syphilis. It occurs more frequently after the longer continuance of the disease. Of Mauriac's eleven cases, he found that the period of the appearance was seven, three, nine, fifteen, six, four, twelve, and two months after the first evidence of the disease. Mauriac's average time was the sixth to the seventh month. Zeissl saw it after fifteen years. I have myself seen it after nine, twenty, and thirty years. Fournier has seen only a single case of gumma in muscles other than those of the tongue in hereditary syphilis. This case involved the superior and internal portion of the right calf, and was situated in the gastrocnemius muscle of a child of fourteen years. He has seen four cases in the tongue in hereditary syphilis. The ages of the patients were twelve, fourteen, sixteen, and twenty-four years.

Muscular lesions in syphilis occur generally in several foci in a single muscle or in several muscles. Where a single gumma occurs in a single muscle, especially in hereditary syphilis, it is usually mistaken for sarcoma.

Diagnosis.—The earliest diagnostic signs are increased tension, consistence, size, and nocturnal pain limited to the muscle. The further development of the lesion, if it be the chronic interstitial syphilitic myositis, is that of permanent contracture of the muscle with an altered consistency and contour; if the process is gummatous, however, its diagnosis from sarcoma becomes difficult without the aid of antisyphilitic treatment. The gumma is, however, distinctive, in that it presents no tendency to further development, but undergoes an extensive fatty degeneration and coagulation necrosis; whereas in the sarcoma, though no future development of an organized tissue occurs, its tendency to coagulation necrosis and fatty degeneration is not so early marked. Gummata are again more frequently seen as multiple lesions, either in a single or several muscles. Traumatic influences act equally in both diseases as an occasioning cause. In all cases the previous history of the case and the action of antisyphilitic treatment must in a large measure decide the case.

BURSITIS.

The bursites seen in syphilis are divided into two varieties: the acute or irritative, and the chronic or gummatous bursites.

The *acute* or *irritative bursitis* is a rare affection. It is an accompaniment of the joint lesions occurring in the secondary period. It is a bursitis attended with redness, pain, heat, and swelling. The bursa is tense, and fluctuation can be obtained. It is capable of a complete resolution, and such is generally the course. They have been seen by Finger, Fournier, Gosselin, and Verneuil.

The *chronic or gummatous bursites* are more frequently met with than the above variety. The affection is in the main painless, and of an indolent character. The bursa is either primarily involved, or it becomes secondarily involved from some gummatous process in its neighborhood. Whether primarily or secondarily involving the bursa, the disease presents itself as a nodular infiltration of the bursa, with a small amount of puriform fluid within it. As the process advances the subcutaneous tissue and skin become involved. Pain now is a more noticeable symptom. Finally, the skin is destroyed and a gummatous ulcer is left.

Keyes has described fourteen cases, and in twelve the bursa was primarily involved.

The præpatellar bursa was involved five times; the bursa over the tuberosity of the tibia, once; the bursa between the semitendinosus and the lateral ligament of the knee-joint, twice; bursa over the malleolus, once; bursa beneath a corn, once; bursa in palm of hand, once; bursa over the olecranon process, once.

Men and women are affected in equal proportion.

The earliest time at which it appeared was one and a half year after the chancre; the latest period at which it was seen was eight and a half years.

TENDONS AND SHEATHS OF TENDONS.

Marked swelling of the sheaths of tendons has been described by Hölder, 1851. Verneuil has seen in the early stage of syphilis, in the tendon sheaths of the finger, an acute and painful hygroma, over which the skin was unaltered in appearance. It involved in four cases the extensors and tendons of the fingers, and did not extend above the dorsal ligament. They occurred at a time when the throat symptoms and the roseola were present. Fournier considers them common, and has seen such hygromata in the extensors of the toes, the tendo-Achillis, biceps brachii, biceps femoris, the supinator longus, and peronei.

Baumler describes a case of Nunn's, in which a gumma arose on the tendon sheaths of the dorsum of the foot, as well as upon the tendon sheaths of the inner side of the knee, in the same person.

Chouet described a similar case upon the sheath of the musculus peronei anterior. The syphilitic gummatous manifestations involving the sheaths of tendons are pre-eminently late in their development, occurring often fifteen or twenty years after infection.

The *acute irritative tenosynovitis* is painful, and attended with an exudation within the sheath. The skin over the sheath is red in proportion to its acuteness. Motion is painful, and is attended with a crepitation, due to the fibrin upon the sheath. The result is either complete resolution or a hydrops of the sheath.

The *chronic tenosynovitis* presents itself as a painless, fluctuating hydrops, with crepitation at times upon motion. The skin over the sheath is unaltered. It shows but little tendency to remain stationary, but is constantly advancing, with a hyperplasia of the tendon sheath, and with increased exudation of a thick, tenacious fluid.

These varieties occur in both sexes, and most frequently involve the extensors of the fingers and toes, the biceps, peronei, and less frequently those about the knee-joint.

The *gummatous tenosynovitis* is recognized as a round or spindle-shaped swelling involving the tendons. It grows slowly and painlessly, remaining as a gummatous swelling, becoming calcareous or extending to the surrounding tissues—i. e., to the subcutaneous tissue and skin.

These gummata occur most frequently upon the tendo-Achillis, the biceps, or radial tendons.

APONEUROSES.

The early involvement of the aponeuroses has been observed, yet the later variety of syphilitic disease, the gumma, is the more common. The early manifestations have nothing which allows of a definite diagnosis except the localized pain, which is increased at night and by pressure. This is most evident in the Galea aponeurotica of the skull, which is sometimes the seat of the headache.

Gummatous infiltrations in the aponeuroses result more frequently from extension from other tissues—namely, the muscles and subcutaneous tissue—than is the case of a primary involvement. Lang mentions having seen a case in which the intermuscular aponeurosis of the arm was alone involved.

SYPHILITIC AFFECTIONS OF THE BONES.

By W. R. TOWNSEND, M. D.

The various bones of the body may be affected with syphilis either during the primary, secondary, or tertiary stages of the acquired, or during the early or late stages of the inherited, form.

Gummata comprise the most typical lesions, and may occur in the periosteum, beneath it and on the bone proper, within the bone, or in the medullary canal. They are tumors, so incorporated in the neighboring tissues as to give no well-defined boundaries, and rarely become encapsulated.

In color they are pinkish gray, more or less vascular, and resemble granulation tissue. In process of growth a gumma presents a series of nodules, each possessing its own center of formation. These nodules are more or less distinct, and are recognized by the fact that the cellular elements of the central portion are small, and have fallen into a molecular detritus, while those of the periphery are larger, round or fusiform, and are confounded with the neighboring embryonal tissue. The nodules themselves are very irregular in their form and dimensions, varying from one fifteenth to one tenth millimetre in diameter. The blood-vessels penetrate to the periphery of each nodule and may there ramify. They are permeable, and contain blood even when the center of the nodule is in a state of atrophic degeneration.

In the development of the gumma two stages are recognized. During the first the medullary substance of the bone is increased, there is proliferation of the cells of the marrow, and the osseous canals are filled with embryonal tissue. The osseous trabeculæ become thinned and absorbed, thus giving rise to large medullary spaces in which the gummatous nodules form.

The next stage consists in the formation of hard, caseous masses, which may eventually become calcified, or in the formation of abscesses, which sooner or later come to the surface. In other words, gummata produce a *rarefying osteitis*, and this is later followed by a *formative osteitis*. In this manner a gumma may be entirely surrounded by new bone, and the diameter of the bone be thus increased. Fig. 1 clearly illustrates such a case, as reported by Lannelongue and quoted by Fournier. The left humerus in the lower half of its diaphysis shows a fusiform swelling, the bone being twice its natural size. The swelling, the edges of which are even, is situated a little above the epiphysis; on section, the center of the bone is found to contain a gumma, partly broken down and separated at some points from the bone structure.

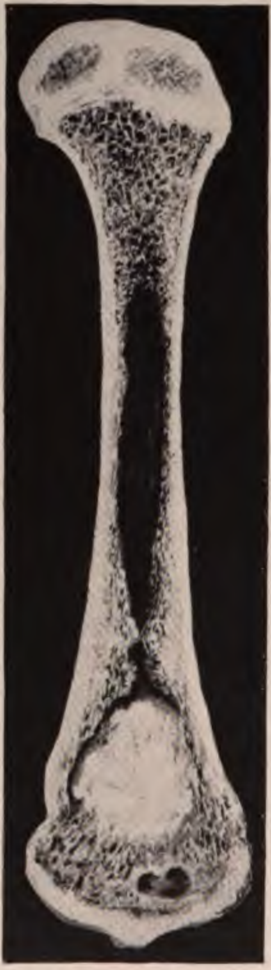


FIG. 1.—Gumma of medullary canal. Hereditary syphilis. (After Fournier.)

Gummata, when affecting the exterior of the skull, appear at first as soft tumors, and subsequently become firm as the bone-cells beneath develop as a result of an osteoperiostitis. Fig. 2, reproduced from Fournier, shows a case of gummatous tumors of the skull. In this child, as a result of hereditary syphilis, there were present gummata of the bones of the skull, humerus, femur, lungs, etc. The gummata of the skull were in varying stages of development; on the frontal bone alone there were six, the largest extending from one supraorbital arch to the other, and measuring some four centimetres in length, being raised at least two and a half centimetres from the skull. The results of specific disease are modified in proportion as the tissue attacked is the periosteum, the bone proper, or the medulla. Age also has an influence, for lesions occurring in early life are more apt to undergo degeneration than those occurring later. The ultimate results are either atrophy of tissues already formed or the formation of new products. If gummata develop in the periosteum, the result is a periostitis.

Syphilitic Periostitis. — In the earlier stages of bone disease the periosteum is the tissue most frequently affected. The first step in the pathological change is hyperæmia or increased vascularity, which produces a swelling consisting of a network of new connective-tissue fibers, in the interspaces of which are found numerous nucleated cells resembling white blood-corpuscles. The walls of the blood-vessels and lymphatics become thickened, and around them are layers of cells. The fibrous elements of the periosteum become more swollen, the vessels contract, mixed infection occurs, and an abscess forms. When gummata which produce periostitis do not go on to degeneration, and inflammatory changes do not occur, then the periosteum may resume its normal condition or permanent thickening may remain. Very frequently, however, we have involvement of the bone beneath and an osteoperiostitis results.

Specific Osteitis does not vary from nonspecific except in causation, and is in most cases primarily a rarefying osteitis, and subsequently a result of the destruction of tissue; when reparative processes take place, there is a formative osteitis.

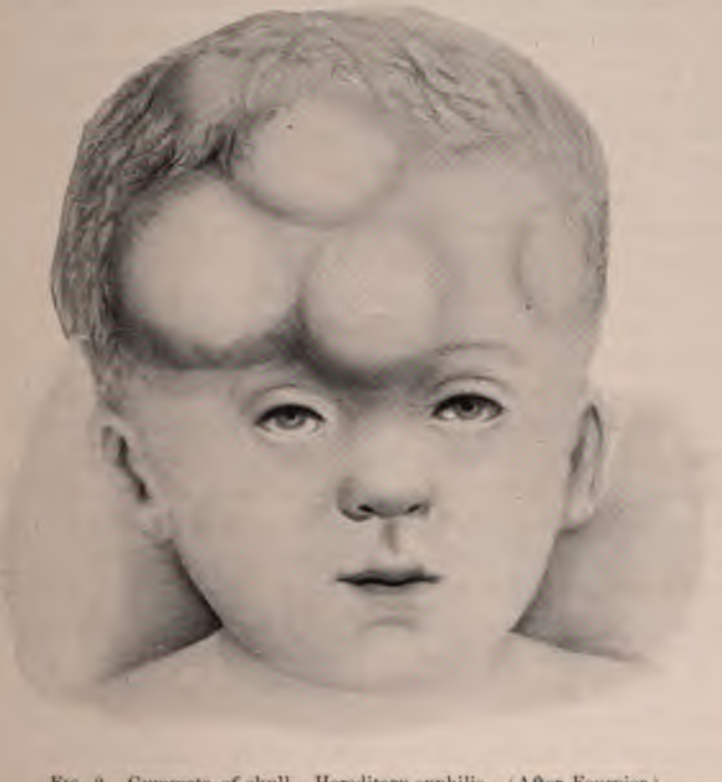


FIG. 2.—Gummata of skull. Hereditary syphilis. (After Fournier.)

Rarefying Osteitis.—In this variety of bone inflammation absorption of the bone tissue plays a prominent part. The disease begins in the soft tissues about the blood-vessels, there is enlargement of the superficial Haversian canals, and as a result a thin layer of bone becomes eroded and finally disappears, or, by pressure of the cellular products on the blood-vessels, the circulation may be arrested and a partial necrosis occur. The first changes consist in the formation of embryonic cells in the medullary spaces, in the Haversian canals, and under the periosteum. These cells resemble those found when bone develops from cartilage. The portion of bone affected becomes embryonal in character, and an enlargement of the Haversian canals occurs by absorption of the osseous tissue about them. The osseous lamellæ are eroded in such a manner as to form notches, the bone-corpuscles at the edges of these open, and the contained cells escape and join the embryonal cells in the medullary spaces. These osseous lamellæ gradually disappear, and adjoining Haversian canals unite to form irregular spaces in which the embryonic marrow proliferates. This absorption has been supposed to be due to the fact that pus from these osseous abscesses contains lactic and phosphoric acid; that the absorption is preceded by a mucous change; that the bone-corpuscles enlarge and cause a solution of area of the osseous substance, corresponding to the cartilaginous capsule from which the bone-corpuscles and its territory are formed; and that the absorption is due to a fatty degeneration of the bone-corpuscles; but Cornil and Ranvier think no one theory satisfactorily explains the condition.

In syphilitic disease the process is usually limited, although it may extend over the entire surface of a flat bone or from end to end of a long one. While the irritation continues which causes a rarefying osteitis, no attempt at repair occurs. More and more tissue becomes eroded, and the broken-down material is carried away, or remains in the form of a sequestrum surrounded by granulation tissue. As soon as treatment is instituted, or when the discharge is free and irritation no longer exists, the tendency is to repair—to a formative osteitis.

Formative Osteitis.—In this process the formation of new bone is the prominent feature, and this new bone may form beneath the periosteum and between it and the old bone, within the bone itself, or within its medullary cavity. On the surface of the bone, when the deposits are very small, they are termed *osteophytes;* when larger, *nodes* or *exostoses;* and if the entire length of a bone is involved, the process is known as *hyperostosis.* Where the new bone encroaches on the medullary canal we speak of *enostosis.* An examination of the new bone thus formed shows that on the surface of a long bone, for instance, the vessels and trabeculæ have a different direction from those of the old bone. The Haversian canals and blood-vessels are perpendicular to the surface. This is due to the fact that the osteoperiosteal vessels in the new tissue come from the Haversian canals at the surface of the bone, and it is around these that the new lamellæ are formed, as in physiological ossification, from elements of embryonal tissue.

The formation of new trabeculæ is at the expense of the embryonal cells produced in the rarefying osteitis, and takes place around the edges, where the disease is of least intensity, and thus there may exist depressions, surrounded by new bone, with much irregularity on the surface of the original bone. The trabeculæ come from the old bone and traverse the embryonic tissue; along their sides are found numerous cells, which become partly imbedded in the new osseous tissue forming about them. It is not necessary that the periosteum should cover the bone in order to have new formation of osseous tissue upon its surface; but the preservation of the periosteum, and especially the vessels of its under surface which enter the Haversian canals, assist greatly.

When cavities have been produced in the bone proper or in the parts adjacent to the medullary canal, new bone may form in a similar manner as on the external surface, and thus close or fill up the cavities. Occasionally in this same manner a central sequestrum may be surrounded by new bone, and repeated attacks of osteitis occur until it is removed, and this may take years.

When formative osteitis involves the bone proper, it leads to its sclerosis or hardening; the process is also spoken of as eburnation and as condensing osteitis. This new bone is very dense, and of ivorylike consistency. If it occurs near the medulla, the process may encroach upon and even almost entirely obliterate the canal. On the surface of a bone this hardened portion may simply involve a part or may extend around the entire circumference. In rare instances a condensing osteitis may occur just under the periosteum, while the center of the bone is being destroyed by a rarefying osteitis, and the new and dense bone thus support a shaft that might otherwise easily break.

A rarefying or formative osteitis may cause changes in the shape of a bone, and especially at the articular ends. In this manner joints may be seriously affected in their motion and utility. In young children a separation of the epiphysis and the diaphysis may occur, which leads to the condition spoken of by Parrot and others as pseudo-paralysis. If the condensing osteitis is active, premature ossification may occur, and this is most often seen in the skull, resulting in asymmetry and the production of the so-called "natiform skulls."

When the new bone so constricts the Haversian spaces and medullary canal that the blood supply is cut off, we have necrosis. That portion of bone the blood supply to which is thus cut off is termed a *sequestrum*. It acts as a foreign body, and about it there occurs a rarefying osteitis with numerous granulations. The Haversian canals become enlarged by the proliferation of the marrow and the absorption of the osseous lamellæ. This absorption continues, destroying the living trabeculæ and also those in which the vessels are obliterated, until the canals communicate one with another. The disappearance of the trabeculæ entirely isolates the sequestrum in the midst of a granulation marrow. The result of this process is that the sequestrum is bounded by a sinuous surface, the prominences of which correspond to the vascular distribution where the circulation has ceased.

When the necrosed tissue is on the surface of a bone it soon separates and is carried away in the discharges. If deeper in the bone, the separated portion acts as a foreign body and produces a constant irritation, so that a sinus connecting with the exterior may exist until the sequestrum is finally removed.

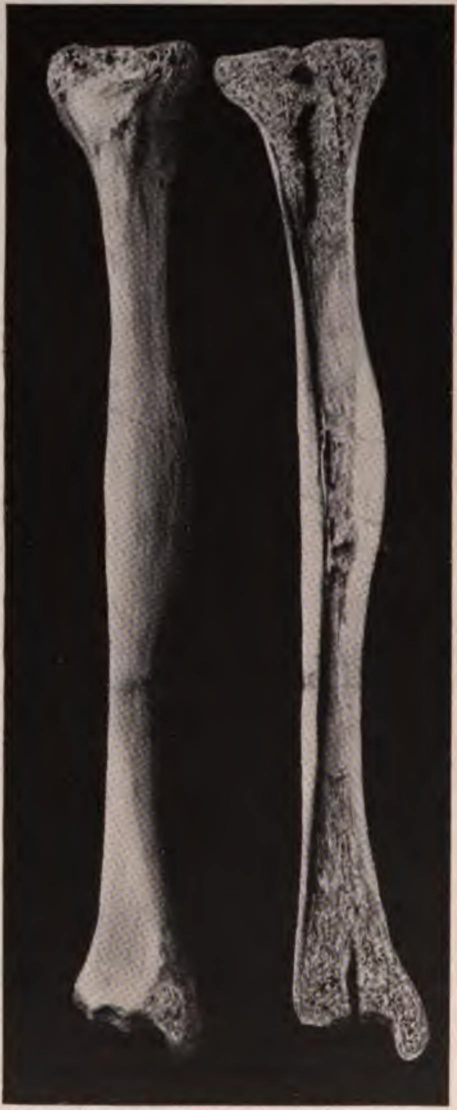


FIG. 3.—Exostosis of tibia. Acquired syphilis.

The irritation may diminish at times and the sinus close, but it will never heal until all the necrosed bone is eliminated.

The sequestrum may resemble normal bone, both externally and internally. It may present losses of substance here and there, or be smooth and regular. In the skull the diploë may be changed into compact tissue, and the sequestrum may be incased by a rim of new osseous tissue, but it is never completely walled in, as occasionally occurs in the long bones.

A microscopical examination of sequestra from the skull shows the medullary cavities of the diploë replaced by narrow canals, and these are due to the formation of new osseous tissue, deposited layer by layer in the interior of the old canals, thus narrowing them. This process continuing, the canal may be completely obliterated, so that at the center of the concentric layer, instead of a canal, there is found one or more bone-corpuscles.

Osteomyelitis.—When the medulla is first affected we have the pathological process known as osteomyelitis. Gummatous osteomyelitis may develop very slowly, and in some cases the gummata never break down, but may become practically encapsulated and surrounded either by the old or by new bone. If the gumma breaks down it may find an outlet either through the epiphysis and into a neighboring joint, or through the bone proper. If the process become infected with pus-cells either before or after coming to the surface, symptoms may be acute and the process rapid, and, if not properly treated, destructive to life. From an osteomyelitis the entire bone may be thickened, or, as in cases where there is simply a small gumma present, the change in size of bone may be very slight.

In acquired syphilis in the same subject may be found gummata that have become organized, with bony tumors resulting; and also instances where the breaking down of these tumors has resulted in necrosis and loss of tissue. Figs. 3, 4, and 5 are all from the same patient, and were photographed from specimens in the Pathological Museum of the New York Hospital. Fig. 3 shows an exostosis on the tibia, giving both the external appearance and a view on section through the bone. The tumor is distinctly localized, and is situated at the junction of the middle and upper third.

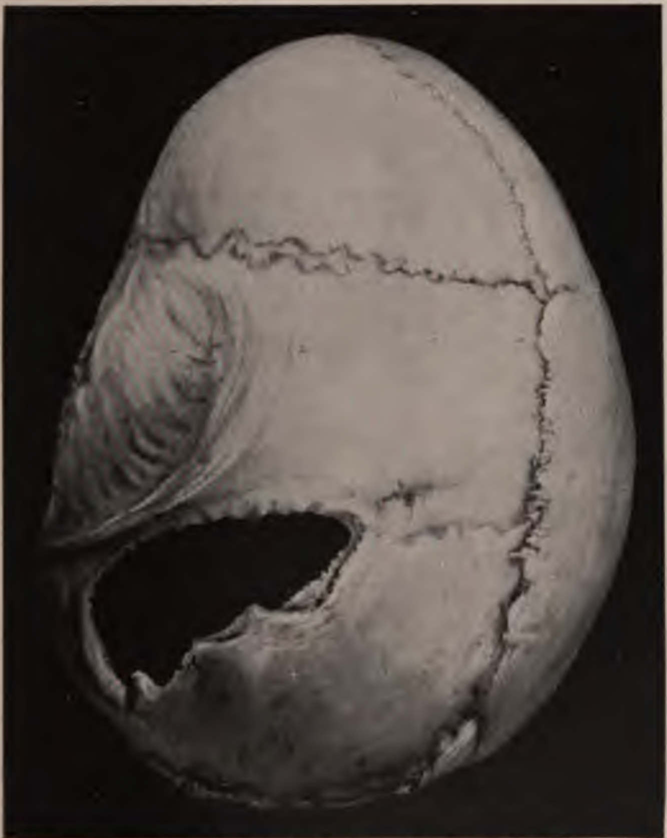


FIG. 4.—Destruction of external and internal tables. Acquired syphilis.

In Figs. 4 and 5, the skull shows, in the posterior part of the left parietal bone, a large loss of substance, oval in shape, and about three by two inches in diameter. Its long diameter is in a line running from the vertex of the skull downward and backward, and only the interior half shows loss to the outer table; over the posterior half there is hyperostosis of the outer table, so that the skull is almost normal in thickness, notwithstanding the loss of the inner table.

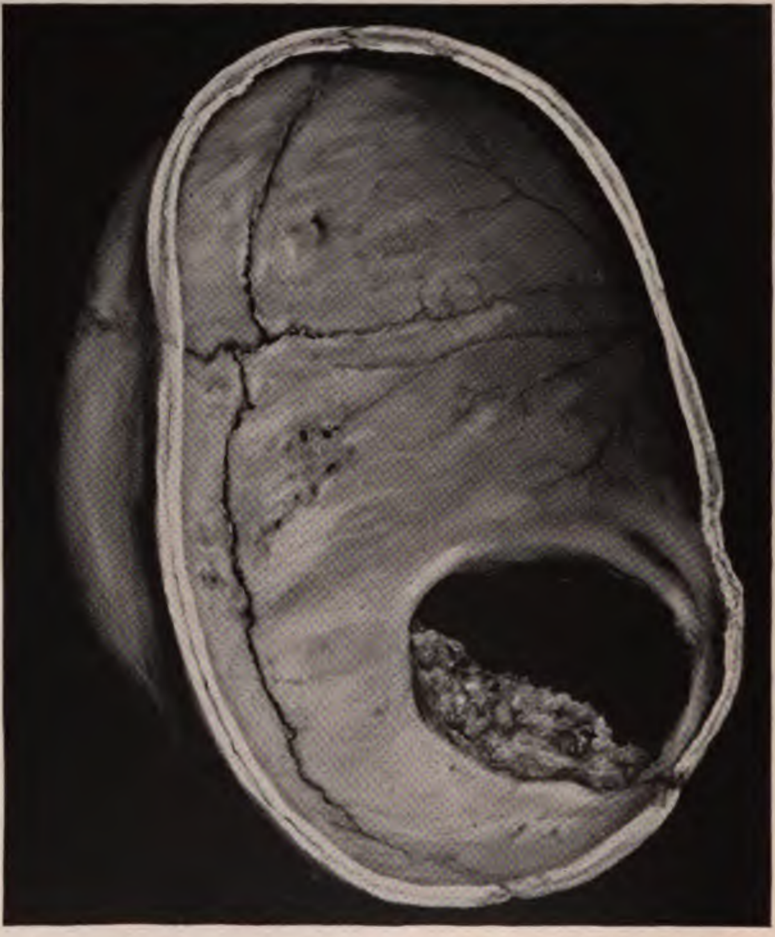


FIG. 5.—Destruction of internal table, without involvement of external table. Interior view of Fig. 4.

At the autopsy the dura mater beneath the whole oval space was absent, and an abscess penetrated the brain to a depth of about two and a half inches. The meshes of the pia mater were everywhere infiltrated with pus. The pericranium was thickened over the opening in the skull;

the other tissues of the scalp were normal. The clinical history of the case was clear; the patient had a chancre in early life, but the date at which the tertiary symptoms appeared was not given. The cause of death was abscess of the brain.

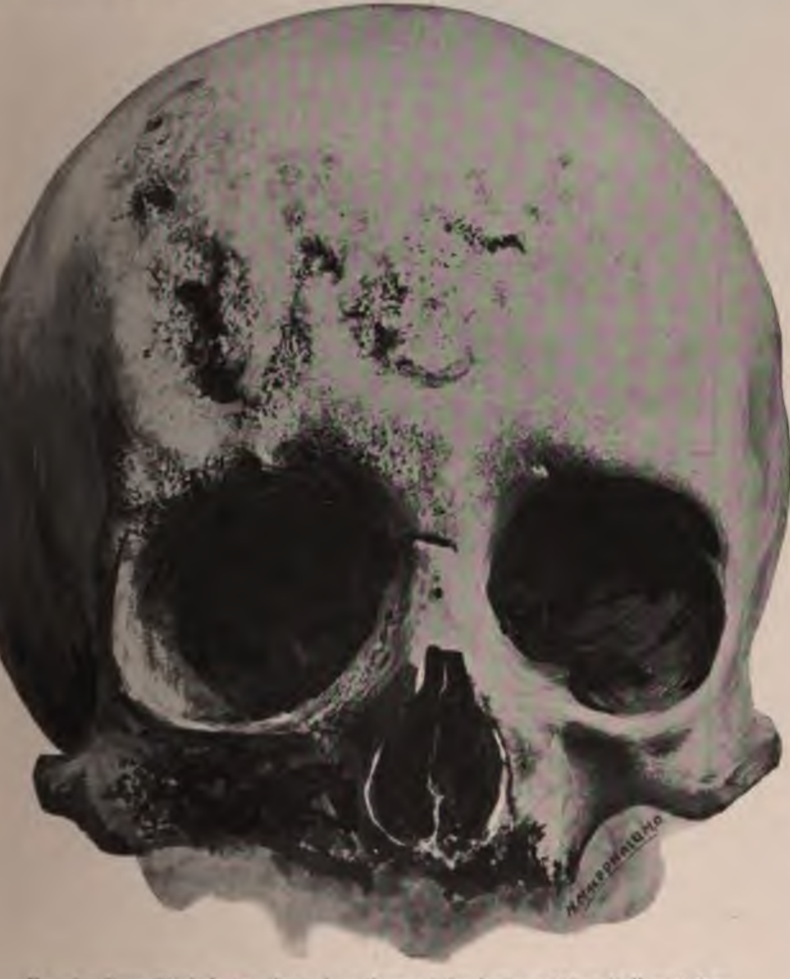


Fig. 6.—Superficial destruction of portions of the bones of the skull and face. Acquired syphilis.

Fig. 6, also from the Pathological Museum, New York Hospital, shows another skull, in which the destruction of tissue is mostly confined to the external table; although at one point in the frontal bone perforation has taken place through both tables. In this case the anterior alveolar process of the upper jaw had disappeared, and there were two large perforations through the palatine processes of the superior maxillæ. The anterior arch of the atlas and the body of the axis had been partially destroyed, and the two vertebræ are firmly anchylosed to each other and to the skull by the articular processes.

Fig. 7 illustrates the exostoses of the skull found in cases of hereditary syphilis, and is taken from Parrot's work. These exostoses are often spoken of as *Parrot's nodes*, and are very constantly found in the inherited form of the disease.

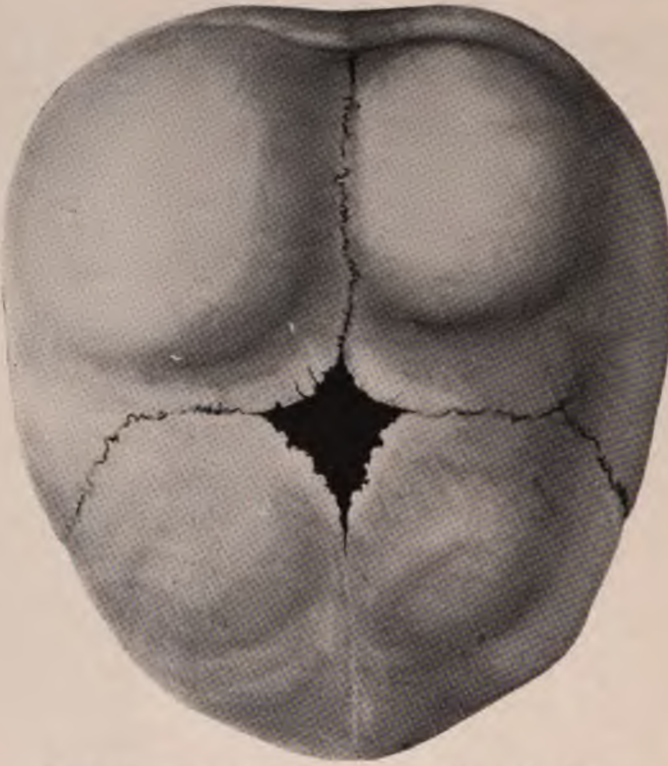


FIG. 7.—Exostoses of skull. Hereditary syphilis. (After Parrot.)

ACQUIRED SYPHILIS.

In acquired syphilis bone lesions are most frequently seen in the tertiary stage, although they may occur in the primary or secondary.

Primary Stage.—In the primary stage the bone lesions are rare; although Swediaur says that they have been observed as early as the fifth day after the appearance of the chancre, instancing a case of a node of lower end of ulna, and Mauriac reports several cases where the bone symptoms appeared before the skin lesions usually spoken of as characteristic of the second stage. The skull is the part most frequently affected, and the lesion consists of a periostitis, usually mild in character and readily cured.

Bone lesions in the early stages most frequently occur between the fifteenth and the one hundred and twentieth day after the appearance of the chancre, and may constitute the first symptom suggesting systemic infection. Although yielding promptly to treatment, they are apt to recur. From the standpoint of prognosis early bone lesions may indicate that the disease will be severe in character. Suchanek states that in Prague bone syphilis has been seen in seven cases out of one hundred during the primary stage. Mantegazza has seen in South America bone lesions and destruction of the nose almost immediately after the appearance of the chancre and before its cicatrization. Other observers, however, consider these instances as exceptional. The following history, from Mauriac, is of interest:

Periostitis of frontal bone, appearing thirty-four days after the chancre, four days before the appearance of the roseola. Periostitis of right internal malleolus, two days after the periostitis of frontal.

Male, thirty years of age, in good health prior to this attack.

February 1, 1885.—Chancre.

March 3.—Extreme headache, fever, and sweating at night. No sign of general infection. Ordered the iodide of potassium.

March 6.—Despite treatment, a node appeared on left side of the frontal bone.

March 8.—Periostitis of right internal malleolus.

March 10.—The thirty-fourth day after appearance of the chancre. The periosteal tumor much increased in size. Appearance of the roseola. Under proper treatment the patient made a good recovery.

Secondary Stage.—In this stage the bone lesions are occasionally met with, perhaps more frequently than recorded cases would indicate, as we can not always make the same distinction between the secondary and tertiary that we can between the primary and the secondary. In fact, the secondary and tertiary symptoms may appear almost simultaneously. An interesting case of acquired syphilis where these conditions existed is the following from Mauriac: A child two years of age contracted a specific sore on its upper lip from kissing its mother; following this there appeared a roseola and mucous patches on the vulva and anus, multiple exostoses and gummata on the frontal bone, and swelling on lower and inner sides of the humeri, all of which readily yielded to proper treatment. According to Popescu, the different parts of the bony skeleton most frequently involved are:

Frontal bone	27·9	out of	100.
Tibia	16·3	"	"
Ribs	13·9	"	"
Parietal	9·3	"	"
Other bones	7·9	"	"

Tertiary Stage.—In this stage bone lesions are frequently found. Jullien states that the relative frequency of symptoms in the tertiary stage is:

Affections of the skin	54·3 in 100.
" " bones	27·7 "
" " testicles	11·3 "
" " nervous system	8·3 "

The average date of appearance has been found to be four and a half years after the initial lesion in a series of two hundred and eighteen cases. The bones may be affected as a first symptom in the tertiary stage or after the other organs.

The tertiary stage may appear very late after the chancre. Fifteen, twenty, and even more than fifty years may elapse, and one case is recorded where seventy-three years intervened, between the chancre and the appearance of the bone lesions. The effect of treatment has an influence upon the date of the appearance of the bone disease. In cases where mercury had not been used the average date was three years and nine months after the initial lesion, as compared with four years and six months in those to whom mercury had been given. The effect of treatment of syphilis in its early stages also has an influence upon the relative frequency of the osseous symptoms. Where mercury was given *ab initio*, we find bone lesions in twenty-one cases out of one hundred; where mercury was given upon appearance of some of the secondary symptoms, in twenty-three cases out of one hundred; and where no mercury was given, in twenty-eight cases out of one hundred. As to the relative frequency of the different bones affected, Jullien gives:

	Cases.		Cases.
Nose	19	Clavicle and maxillæ, each	2
Tibia	15	Frontal	1
Palate	15	Parietal, vertebræ, each	1
Sternum	15	Scapula, ulna, and patella, each	1

The character of the lesions was:

	Cases.		Cases.
Necrosis	20	Osteitis and periostitis	12
Exostosis	15	Circumscribed gummata	11

Virchow, among other observers, believes that traumatism plays an important *rôle* in the production of the osseous lesions. Most of the bones affected are situated near the surface and are liable to bruises or contusions, and as such injuries are common it is possible that too much importance has been ascribed to this cause. The influence of other diseases in producing bone lesions is probably very slight, although any disease that lowers vitality may occasionally be the cause of tertiary symptoms appearing earlier, and may increase their severity.

In acquired syphilis gummata may form on any of the bones; but it was seen by the tables of Jullien and Popescu that the most frequent sites were the cranium, face, and tibia. In the skull the periosteum is usually the first tissue involved, and either the external or internal table may subsequently be affected. If the internal table alone is diseased nothing may be detected by external examination, but the patient may have symptoms due to pressure, such as pain in the head or along the course of the nerves passing by the affected portion. If situated near the ear, there may be deafness; if near the eyes, interference with vision.

When the bone is involved loss of substance usually results. This loss may be slight, and around the site new bone may be formed, or a large portion of the skull may be necrosed and disappear, as in Figs. 4 and 5. The superficial losses of substance may be serpiginous in character or in the form of rings or half circles, often resembling in shape some of the skin lesions.

The bone affection may also be secondary to gummata in the dura mater or scalp, although the latter is rare. In some cases exostoses may form and permanently remain, but bone lesions affecting the skull are prone to degeneration. The same is true of the bones of the face.

The nasal bones when attacked by syphilitic disease nearly always necrose, and as a result loss of the bridge of the nose occurs, with the production of the peculiar deformity of flattening of the upper portion and prominence of the lower portion of the nose—a sunken nose. In some the soft parts are not involved, except the mucous membrane of the nose, but this always results in a more or less offensive ozæna. It is rare that only one bone is diseased, for, in addition to the specific infection, there are present in most instances the bacteria of inflammation.

Great destruction of the soft parts frequently ensues, and this will increase the resulting deformity. From the nasal bones the disease may extend backward and involve the ethmoid and the bones of the skull, or downward and attack the palate and parts adjacent, or it may even extend to the vertebræ. The amount of tissue destroyed varies much in different individuals, and largely depends upon the time at which proper treatment is begun.

Fig. 8 illustrates the loss of the bridge of the nose, and in this patient the entire cartilaginous septum is also wanting. The patient is a female, aged forty-two, married seventeen years; denies any specific history; husband examined, but with negative results. Seven months after marriage had a miscarriage; one year later a stillbirth at full term. Her third child died during the first year of life, cause unknown. Her oldest child, a boy of fourteen, has syphilis affecting the throat and parts adjacent; the next, a girl of twelve, has bone lesions of tibiæ and humerus. These two cases are reported under the head of hereditary syphilis. A baby of one year and a little girl of three seem perfectly healthy. Woman denies any disease until three years ago, when, she says, a discharge appeared from the nose; this increased, and the nose, which was perfect until that time, gradually lost its shape and finally became flattened, as at present. She was treated locally and by internal medication, and at the end of a year the disease was arrested. The primary lesions were evidently overlooked, and the tertiary bone symptoms appeared about fourteen years later.

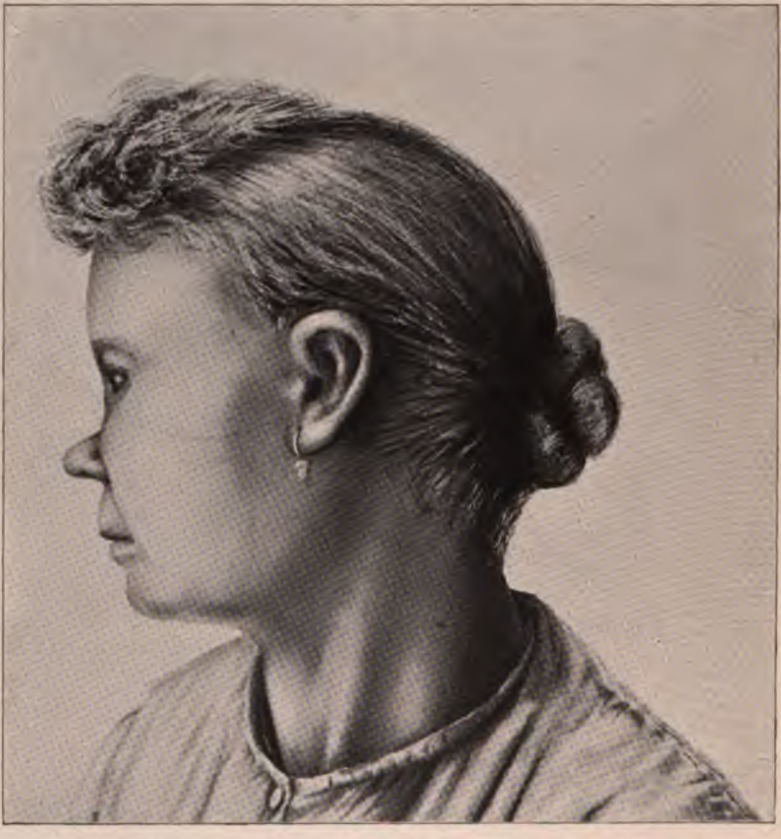


FIG. 8.—Destruction of nasal bones. Sunken nose. Acquired syphilis.

Many interesting examples of syphilis of the bones of the face have been reported, one of the most striking being related by Trousseau in his Lectures on Clinical Medicine, wherein he speaks of an English officer who had a sudden suffocative attack caused by the presence in the nares of a foreign body which had subsequently fallen into the throat. During the seizure he drew forth a large, irregularly shaped and rough edged piece of the ethmoid bone. The disease, however, subsequently extended to the brain, and the patient died with cerebral complications.

Gummata appearing on other bones are not so prone to cause losses of substance, and usually form tumors more or less firm. Under appropriate treatment, if seen before they have become bony in character, they may entirely disappear, otherwise they simply diminish in size or are not changed. They are apt to affect more than one bone, and may follow each other in rapid succession, as in the following case:

Male, aged thirty-eight, applied for treatment on account of pain in spine and loss of motion in right knee, supposed to be rheumatic; admits having had chancre and roseola. Over left sterno-clavicular articulation is a swelling, size of a small hen's egg, tender on pressure. This tumor, he says, has been larger. Is ordered iodide of potassium internally, and mercurial ointment to be rubbed daily, alternately upon the arms and legs.

Is seen three months later, and reports that under the treatment the symptoms diminished in severity, and he soon discontinued the use of the medicine. He now presents, in addition to the original node, one on the left scapula about the size of a large marble, and one over the junction of the first rib and the sternum slightly larger, and a small one on the left clavicle.

When the vertebræ are involved there may be present a characteristic deformity and all the symptoms of Pott's disease, but in no sense do such symptoms vary from those of tubercular origin. In other cases exostoses may occur either on the posterior portion of the column or in front of the vertebræ, where, if on the upper cervical, they can be felt through the mouth. They may produce pressure on the cord in the central canal, cause myelitis and destruction of the cord, or by pressure on the œsophagus produce dysphagia, or if on the respiratory tract, asphyxia. Levot, in a thesis on syphilitic affections of the spinal column, tabulates seven cases of exostoses and hyperostoses, three cervical, three dorsal, one lumbar; and of osteomyelitis and necrosis, nine cases in the cervical region, three in the lumbar, and one in the sacral. One reason for so many cases in the cervical region is that the disease often extends from the facial bones or from the soft parts in the palate.

Exostoses on the sternum may cause severe pain and give rise to pressure symptoms. The pain may be referred to the heart, to the respiratory tract, or to the region over the bone or near it. Angina, asthma, and other troubles may result, and statistical tables show that this bone is often affected; and care should be exercised, in cases where pain is complained of in this region, to carefully examine the sternum, especially if there is any suspicious history of a previous syphilis. Where the exostosis appears upon the under surface rarely can anything be detected by external examination, though tenderness on pressure may be elicited.

Of the long bones the tibia is most often affected; on its crest are found exostoses, or, when the entire length is involved, hyperostosis. So large an area of the surface of this bone being subcutaneous, it is extremely liable to external violence, with resulting necroses. If there is a coexisting syphilitic disease, the soft parts over the injured area break down, and an ulcer forms followed by a cicatrix. If the shaft is involved, sequestra may be formed, and as a result of a formative osteitis they may become completely surrounded by new bone. The part most frequently affected is the anterior portion of the shaft, and but rarely either extremity. This fact is of interest when compared with tubercular disease.

Elliot (Journal of Cutaneous and Genito-Urinary Diseases for January, 1893) has reported five cases in which he found nodes situated on the hyoid bone, associated or not with chondritis or epichondritis of the thyroid cartilage. The patients referred their pain to the region of the throat in general, and suffered most inconvenience in swallowing, talking, or making movements of the head or neck. No lesions were found in the larynx or pharynx, and when proper treatment was applied the nodes disappeared and the inconvenience ceased.

INHERITED OR HEREDITARY SYPHILIS.

In this form of the disease the bones are more commonly affected than in the acquired form. Fournier's statistics of late hereditary syphilis show that, of two hundred and twelve cases, eighty-two were of the osseous system, a proportion larger than is found in the tertiary stage of the acquired disease. There are several reasons for this excess. Prior to adult life the bone tissue is in a formative condition, and in very early life it is embryonal and more susceptible to pathological changes; and in many instances of syphilis appearing in the newborn no treatment has been given to the child, and often none to the mother.

Under the head of acquired syphilis reference was made to the effects of treatment in relation to the time of the appearance of the bone lesions, and the same is true here. The value of treatment is especially seen in pregnant women, for under the use of antisyphilitic remedies many who have repeatedly miscarried may be delivered at term and the children show no lesions. The time at which the bone symptoms appear varies; the infection occurring *in utero* may be so great that miscarriage or stillbirth is the result, or the child may not show symptoms until some time after birth.

Eduard Krauss (Archiv für Kinderheilkunde, ix, p. 81) out of three hundred and sixteen cases of syphilis, found sixteen involving the osseous system. Of these, eight occurred during the second month of life, one during the third, two during the fifth, one during the sixth, one during the eighth, one during the ninth, one during the tenth, and one during the second year.

Parrot has reported cases of stillbirths where the bony lesions were found; other cases have been reported in children of three weeks of age; but the greatest number are seen during the first six months of life. Between the second and fifth year the disease is rarely seen, as compared with later periods.

Fournier's statistics give: From the third to the fifth year, five cases; from the fifth to the twelfth year, fifty-four cases; from the thirteenth to the nineteenth year, twenty-four cases; from the nineteenth to the twenty-eighth year, seven cases.

These show a very large proportion between the fifth and nineteenth years. Whether the disease may appear later than the twenty-eighth year is doubtful. In some instances hereditary syphilis may exist and yet no symptoms be noticed, and autopsies may determine the presence of lesions that were not suspected during life. Gangolphe reports several such cases in which, probably, had the patients lived longer, symptoms would have appeared, as the lesions consisted of gummata in the bone proper.

As a rule, in young children, when osseous lesions exist, other symptoms are also present, and it may be assumed that the disease is still active, although the author has seen cases where the bones alone seemed to have been involved. Mothers are, however, not always close observers, and the mere statement by them that the child has never had other symptoms is not proof positive. Active and severe forms of syphilis in the mother usually produce similar conditions in the child, including the osseous lesions; but a remote source of infection and a mild form of the disease in the mother is not necessarily followed by a light manifestation in the child. Of eleven cases reported by Taylor, the mothers of three children had been syphilitic fully two years; one was at the end of the first year of syphilis, three were infected at the fifth month, and two became syphilitic at time of conception.

When the severity of the bony lesions in the child are considered, it is found that the earlier the mother was infected the more severe are the lesions. Although the lesions of the children whose mothers had been syphilitic for two years were rather extensive, they showed no tendency to degeneration, and had the mothers been treated the results might have been different, for in all these cases there was no treatment, or it was very inefficient.

Whether the disease occurs soon after the birth of the child or later in life it presents a predilection for certain bones and for certain portions of these bones. In very young children we find most frequently affected the bones of the skull and the long bones, such as the humerus and tibia.

In later life Fournier gives: Tibia, ninety-one cases; ulna, twenty-two; radius, fifteen; humerus, twelve; femur, eight; fibula, four; clavicle, five; bones of the skull, sixteen; other bones, twenty; total, one hundred and ninety-three cases.

The tibia is affected in nearly half of all the cases, and these one hundred and ninety-three examples were seen in sixty-nine patients—which is a matter of diagnostic importance, as the symmetrical affection of bones, or the involvement of several bones at or about the same time, is highly suggestive of specific osteitis.

Hereditary syphilis, when it affects the skull, may produce ulceration, in which only the external table may be implicated. The parietal, frontal, and occipital bones are those most frequently diseased, and in the order named. The cases where loss of substance includes both tables are rare. The bone may be destroyed at the side opposite to the decubitus, and the left side is said to be affected more often than the right. When formative osteitis occurs about the site of the disease it gives to the skull a peculiar roughened appearance, the result of depressions and elevations.

The most frequent changes, however, are osteophytic in character; in the very young the inner table is most often involved, in later childhood the outer table. The osteophytes produce various changes in the skull. They develop along either side of the sutures, and from the osteitis that often results premature ossification may occur, and thus asymmetry of the skull be produced. Parrot terms these skulls *natiform*, and considers them pathognomonic.

An excellent illustration of these osteophytes or exostoses is seen in Fig. 2. When the parietal bones become prematurely united by new bone, a band may form across the fontanelle and thus form a cross. Craniotabes may also be found. As the children grow older the bony tumors of the skull are not so often seen, and in late hereditary syphilis the skull is rarely affected.

The symptoms of formative bone changes in hereditary syphilis of the skull are the same as in the acquired form. Headache, deafness, hemiplegia, and symptoms of meningitis may all follow, but when the external table alone is involved the symptoms produced may be very trifling in character.

In very young children the lesions are essentially degenerative in character when affecting the long bones, and are in many cases rapidly followed by abscesses; these may burst into the neighboring joints and be the cause of an acute arthritis, or the periosteum may be lifted up for some distance, the abscess finally coming to the surface. As referred to in the pathology, mixed infection is present, and when it is considered that gummata frequently coexist in various visceræ the great fatality of the disease is easily accounted for. In later life destruction of tissue is comparatively rare, except when gummata of the periosteum, or just beneath it, break down.

The tibia is the bone most often affected, and may be the seat of one or more exostoses, as in Fig. 11. On this girl there were cicatrices and active destructive skin lesions about the left knee, but the bones affected showed exostoses only, the right leg having two distinct elevations on the crest of the tibia, the left leg one.

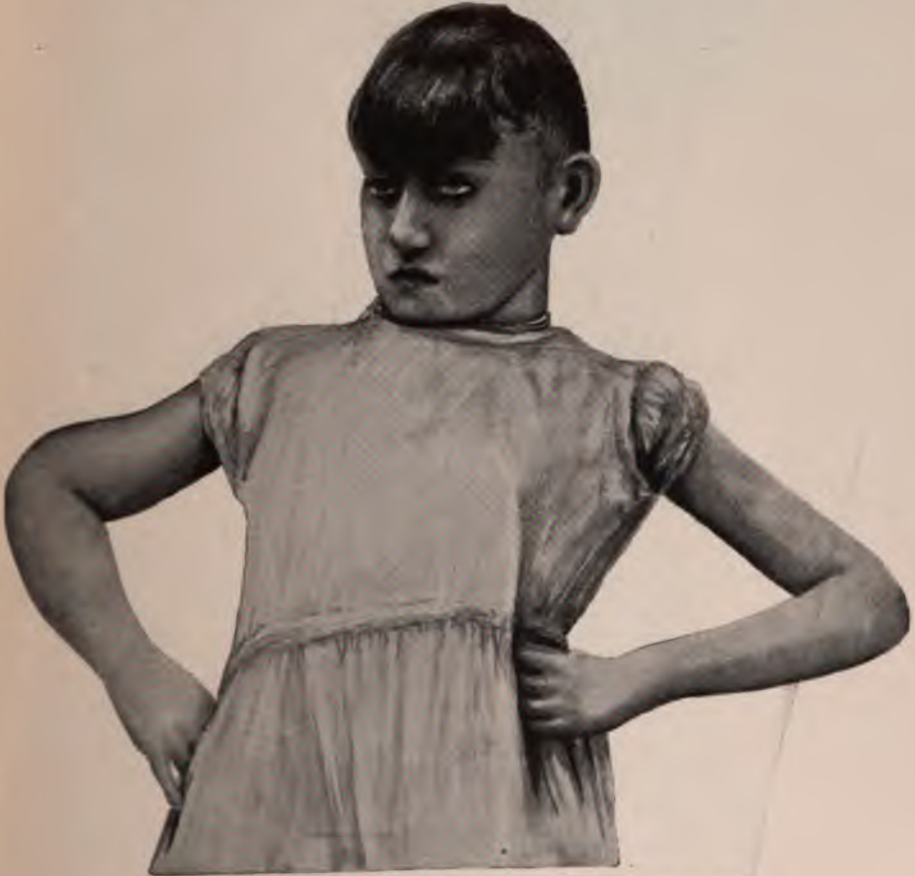


FIG. 9.—Exostosis of lower end right humerus. Hereditary syphilis.

The patient, a female, came under observation in August, 1892. She was then twelve years of age. Family history negative. No opportunity given to examine the parents. The mother reports two miscarriages prior to the birth of this child. The patient was in good health until she was eight years of age, at which time she began to have pains in her tibiæ. Enlargement of these bones was noticed about this time, and increase in size has taken place gradually ever since. A few months prior to the application for treatment a swelling of the right arm was noticed. Examination showed a slight enlargement, probably bony, situated at the upper third of the ulna on its posterior border. Pressure gives pain. The right tibia is enlarged for nearly its entire length, almost a condition of hyperostosis, and shows thickening of its anterior border. At its middle third there is a well-marked prominence, and at its lower third a smaller one. About the center of the upper exostosis is an old cicatrix circular in form. The left tibia is the seat of a well-marked exostosis about the middle of the shaft. Both the tibiæ are painful on pressure. Over the left patella there is a large ulcer affecting the skin only, irregular in outline, and measuring two by four inches. In the popliteal space of the same leg there is another ulcer, red and angry in appearance, with thickened edges, and measuring three by four inches. Both ulcers discharge slightly, and show no tendency to granulation. The teeth are notched. No epitrochlear enlargement. A diagnosis of syphilitic osteitis being made, the patient was given

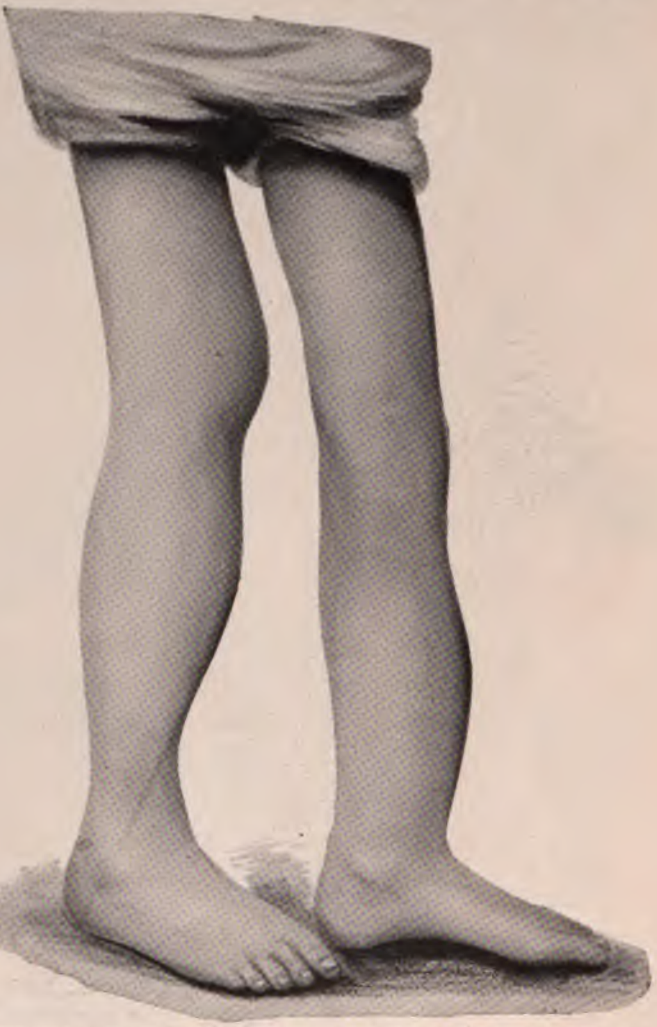


FIG. 10.—Hyperostosis of left tibia, exostosis of right. Hereditary syphilis.

twenty grains of iodide of potassium and one twentieth of a grain of calomel three times a day. This dosage was gradually increased. The ulcers were dressed with iodoform gauze. Examination of the patient in the following October showed complete healing of the ulcers, but no diminution in the bony enlargements. The girl eats and sleeps well, and is entirely free from osteocopic pains. Tibiæ not painful on pressure. This patient was seen again in January, 1893. She had neglected to take her medicine of late, the pains had returned, and two large ulcers had formed over the crest of the left tibia—the upper one affecting only the skin, the lower one going down into the muscular tissue.

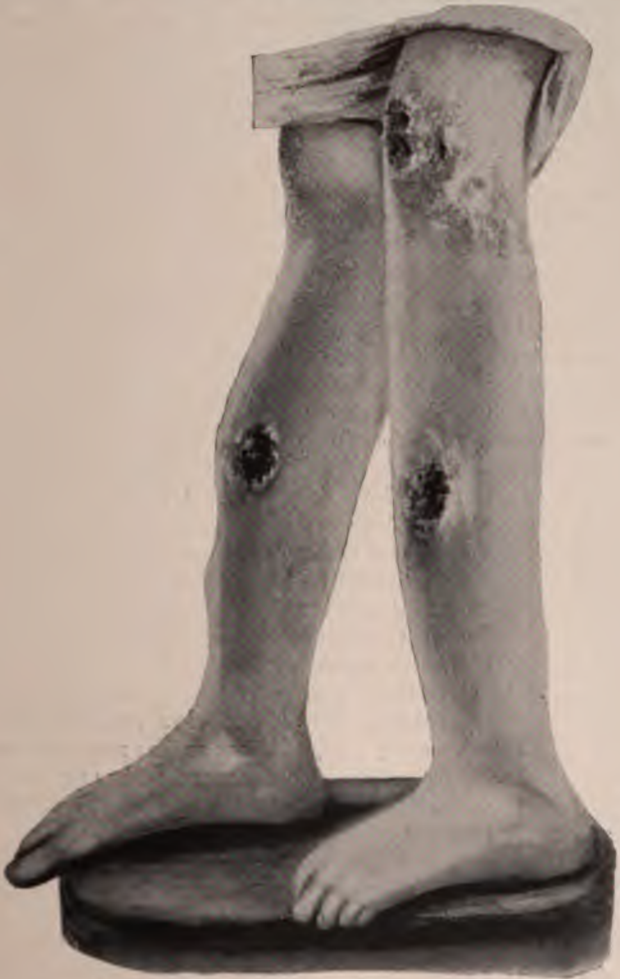


FIG. 11.—Exostoses of tibiæ. Hereditary syphilis.

Striking examples of hyperostosis and exostoses are seen in Figs. 9 and 10.

The patient, a female, aged eleven, was first seen in July, 1892. Her father denies syphilis, and shows no signs of ever having had the disease. Mother was syphilitic, and is the case referred to in Fig. 8. An elder brother has hereditary syphilis. This girl was perfectly well until eighteen months ago, when she began to have pain in the tibiæ. She went to a dispensary and was treated by inunctions and internal antisyphilitic remedies. Noticing very little improvement, she discontinued the treatment, and for the past year has taken no medicine. Her general condition is fair. Just above and both in front and behind the right ear are several cicatrices, the results of gummata that have broken down. These she declared were open ulcers when she first applied for treatment eighteen months ago, and that after taking medicine they healed quite promptly. On the lower and outer side of the right humerus is a firm, oval swelling, about one inch in length by three quarters of an inch in width. The measurements of the two arms at this point are: Right arm, seven, seven and a half, and seven inches; the left arm, seven, six and three quarters, and six and a half inches. These measurements are taken one and a half, one, and a half inch above the elbows, and the exostosis is represented in Fig. 10. The left tibia is thickened for its entire length in front and is bowed forward, showing hyperostosis; the edges are uneven, but there is no marked projecting point. The greatest thickening is about the center. This deformity resembles the condition spoken of by Fournier as the *lame de sabre*, or sword-blade tibia. The right tibia is increased in size, forming an exostosis, and this is especially noticeable just about its upper third. The left is one and a quarter inch larger than the right just above the ankle. In this bone we see a marked change from the normal. The crest of the tibia is not sharp or narrow, but broad and thickened, and for its entire length is bowed forward. There is a slight fullness about the ankle, and both the feet are in *valgus*, the patient having well-marked, flat feet. The tibiæ are painful on pressure. Over the middle third of the tibia is a circular scar the size of a dime and brownish in color. She says no dead bone has ever come away. The patient suffers much from pain, sleeps very poorly, and on account of her flat feet walks with difficulty. The teeth are normal and perfect. All superficial glands of the body are enlarged.

She is given the iodide of potassium internally, and her flat feet corrected by building up the inner side of the shoes—Thomas's method. The patient reports regularly, and in December, 1892, she is found to be very much improved. She can walk better and farther, and eats and sleeps well. The pains in the tibiæ have disappeared, although the size of the bones is unchanged.

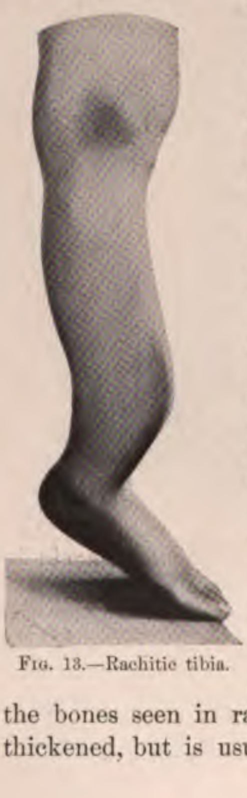
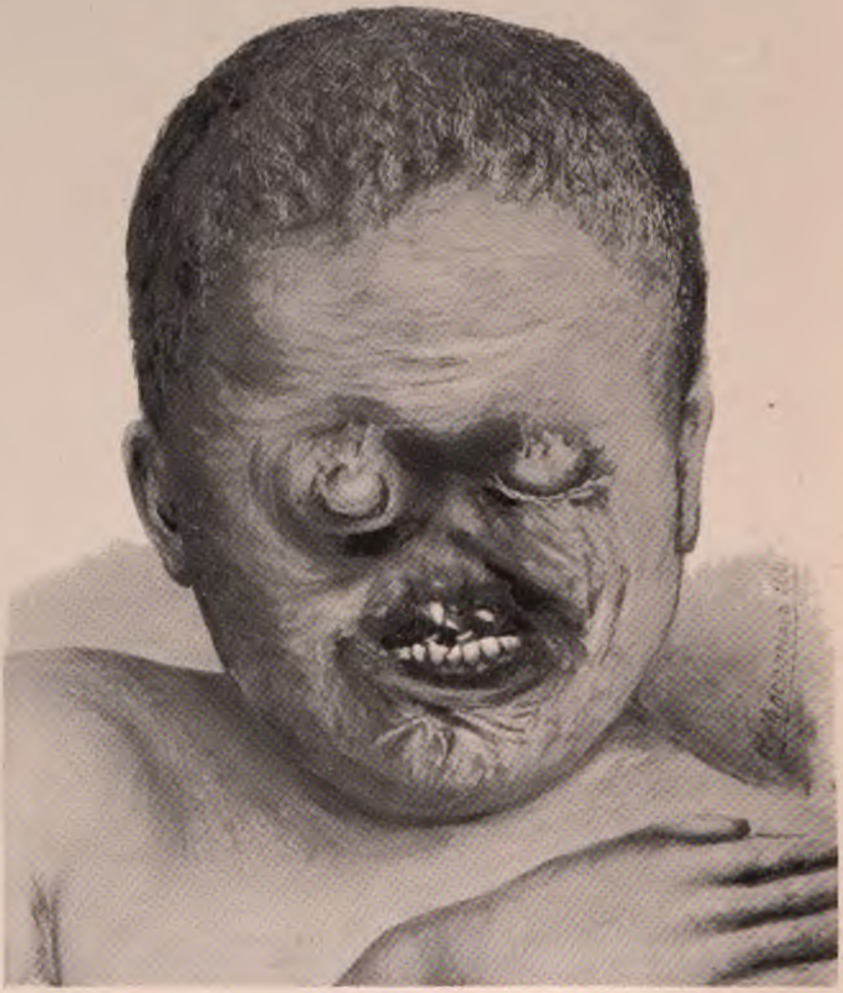


FIG. 13.—Rachitic tibia.

This broadening and thickening of the anterior surface of the tibiæ, with bowing forward or outward, is very characteristic of hereditary bone syphilis, and is very different from the bowing of the bones seen in rachitis. In them the bone, although bowed, is not thickened, but is usually much thinned, the crest of the tibia in some

PLATE XIX.



HEREDITARY SYPHILIS.

cases being unusually sharp. Fig. 13 illustrates very well an anterior curvature due to rachitis. Compared with the long bones, the bones of the skull and face are rarely affected in late hereditary syphilis. When this is the case the disease often extends from the soft parts, and the bones may be affected secondarily, as in the following case kindly furnished me by Dr. Meierhof:

The patient, a boy of fourteen, the eldest brother of the case referred to in Figs. 9 and 10, has been under treatment for eighteen months, and in spite of all that has been tried the disease has steadily progressed. All forms of antisyphilitic remedies and tonics have been tried, but with no great beneficial results. In December, 1892, his condition was as follows: The nasal mucous membrane was in a state of chronic hyperæmia, accompanied with a thin discharge, which excoriated the nostrils. The posterior third of the palate, including the soft and hard parts, had sloughed away; and also the posterior wall of the pharynx for almost its entire width and length, down to a level a little below the epiglottis, had been destroyed, and above the post-rhinal space is exposed, including the base of part of the sphenoid bone. The larynx exhibits a thickened and somewhat distorted epiglottis, although there are no evidences of ulceration at present. If the spread of the disease is not checked and the patient survive, the borders of the upper cervical vertebræ will be laid bare and those parts affected.

Plate XIX illustrates how extensive the lesions of the bones of the face may be. For the history and the privilege of reporting the case I am indebted to Dr. L. Duncan Bulkley.

The patient was a male, aged twenty. Nothing is known of his father. The mother had syphilis. The boy was perfectly well until he was nine years of age, when a small pimple appeared on his left cheek. This was followed by an ulcer, which gradually extended over the entire face, destroying the nose and extending up over the eyes and over the frontal bone. He has been blind for five years, except that he can distinguish light from darkness. The anterior portion of the scalp appears as a cicatrix. The forehead is of cicatricial tissue, and a thin layer of the same tissue spreads over and covers in the left eye. Through this film of tissue the eye can be seen, with its partially opaque cornea, and it is through this he distinguishes the light and the darkness. The right eye appears as a prominent, bulging mass, through which no light can be seen. The nose is wanting, its site completely closed in by scar tissue. The upper lip presents a cleft in the center, exposing the upper teeth and gums. The soft palate and uvula have been destroyed, and the lower lip is so drawn to the left that the corner of the mouth is depressed below the gums, and there results a constant dribbling of saliva. Upon the right wrist, there is an extensive ulcerous surface nearly encircling the member, and leaving only a small bridge of skin upon the ulnar border. The ulcer is about four inches in length and in a very unhealthy condition, having been previously only dressed with mutton tallow. The bone in this situation is exposed, and the patient says a few weeks ago a small piece of bone came away. The joint is stiff, and the hand drawn toward the ulnar side. The fingers can only be moved with great pain. Upon the left leg is another ulcer. Mixed treatment was applied, and three years later, when the photograph was taken, the ulcers had all healed, the sight slightly improved. But very little more can be expected, as the destruction of soft parts is so great as to preclude any successful plastic operations.

The vertebræ are rarely affected in hereditary syphilis. In cases, however, where multiple bone lesions exist it is always well to carefully exclude this cause for the spinal lesion, if possible. The author has only seen one case of Pott's disease that he felt warranted in ascribing to syphilis alone. As a rule, these cases are tubercular, or the syphilis and tuberculosis both exist. The patient referred to was a boy six years of age; the father was not seen nor examined, and the mother showed no evidences of syphilis. The child had snuffles and roseola as a baby, and when five years of age developed an osteitis of the bones on the inner side of the right foot. Under the free use of iodide of potassium this entirely subsided in a short time, and when first seen for his spinal difficulty the boy was about four years of age. He had pain in the back, and a slight projection posteriorly of the mid-dorsal vertebræ. There was a firm cicatrix over the inner side of the foot; no pain or lameness. A brace was applied, and the iodide continued. He did remarkably well for a year, when the mother neglected to give his medicine and to keep the brace properly adjusted. The swelling on the inner side of the foot returned, the pains increased in the back, and he has again begun active and proper treatment. In this patient the osteocopic pains were marked, and much worse at night. An interesting fact in connection with this case, which was referred to the Hospital for the Relief of the Ruptured and Crippled by Dr. Bulkley, was that the grandmother had syphilis, and this child's disease might have been acquired from her.

The multiplicity of the lesions is interesting, and, as previously remarked, may be an aid in diagnosis. The author has recently seen a case of Dr. Koplik's, a child two years of age, with a cicatrix leading to bone on the lower end of the right humerus, and a gumma on the lower end of the left one, gummata on the lower and upper ends of the right ulna, and one on the lower end of the left, cicatrices on the upper ends of both tibiæ, and two gummata on the right tibia. All these were of the size of a large marble. At the junction of the web of the forefinger and thumb on the right hand was an ulcer where a gumma had broken down.

Lannelongue has reported a case where nine different bones were affected at various times between the ages of five and eleven. A patient of Fourneaux Jordan's had nine hyperostoses present on the skull. All the cases referred to in this article had more than one bone involved.

It will be deduced from these illustrations that the lesions produced in the bones in acquired and in hereditary syphilis, while not pathognomonic, are highly suggestive. The combination of rarefying and formative osteitis, followed by sclerosis and eburnation of bone, superficial losses of tissue surrounded by increased growth, the involvement of several bones at or near the same time, the predilection shown for the shafts of the long bones, for the bones of the skull and face, may in many cases lead to a probable diagnosis and suggest the proper treatment, although no positive history of previous syphilis may be obtainable. Tuberculosis and rachitis have probably no effect on the predisposition to bone lesions in syphilis, except in so far as they lower vitality and thus intensify any disease that may exist. Syphilis does not produce tuberculosis or rachitis, although the latter has been affirmed of rachitis by Parrot. His opinions on this subject are not accepted to-day by the majority of syphilographers, and each of his final conclusions has been disproved except the third. As the dispute is still *sub judice*, his views may be of interest. In a work entitled La Syphilis herêditaire et le Rachitis, published in 1886, this distinguished author's views are given as follows:

1. Rachitis is of syphilitic origin invariably, proved by the fact that the pathology is the same as that of the later stages of hereditary syphilis.
2. Rachitis, the last manifestation of hereditary syphilis, is not syphilis, but exemplifies a pathological change.
3. Patients affected with rachitis may contract syphilis.
4. By experiments on young animals we may produce lesions similar to those of syphilis, but not of rachitis.

His conclusions as to the pathology of hereditary syphilis are based upon the study of cases some of which are undoubtedly rachitic. He divides the pathological changes into four stages: 1, *periostogenèse*, which includes *osteogenèse* and *fibrogenèse;* 2, *medullogenèse;* 3, *chondrocalcose;* and, 4, *transformation gélatiniforme.*

Periostogenèse is seen in the fœtus and in early life. The periosteum is thickened, more resisting, and adherent to the bone—it rarely ulcerates; after removal there are found osteophytes, which may be small or large, irregular or even in outline, adherent to the bone, of straw color, hard or friable, and exceedingly porous. The thickness may vary from very little to over three centimetres. Its most frequent sites are the humerus and tibiæ, generally on their lower two thirds. If the osteophytes have developed very early, the shape of the bone may be much changed; if late, there is very little if any change. The bone due to the increase in size is heavier; after the age of six months fibrogenesis occurs. The osteophytes becomes fibrous; a layer of fibers covers them, perpendicular to the diaphysis, of whitish or bluish color, adherent to the bone, and resembling tendon. The chondrocalcareous layer which separates the cartilage from the spongy tissue is slightly thickened.

Medullogenèse is the result of periostogenèse. Spaces arise between the diaphysis and the osteophyte. These are parallel to the shaft, and broken here and there by trabeculæ which are the only vestiges left later on of the old bone or the osteophyte, as the process is a destructive one. It may only leave the external layer of the osteophyte, or the fibrous layer which covers it. The diaphysis may be attacked and its tissue destroyed. The bone is lighter and more porous.

Chondrocalcose.—In this stage the chondrocalcareous layer between the cartilage at the epiphysis and the bone becomes thickened. It may be regularly increased in size or only thicker in places, and may extend in the shape of numerous prolongations into the bone. This layer becomes very friable, and accounts for the fractures or separations of epiphysis from diaphysis. This layer is yellow in color, and only seen in very early cases. Rarely its color differs slightly from that of the spongy tissue of bone.

Transformation gélatiniforme is a more or less complete alteration of the spongy portion of the bone, and even of the osteophytes. It begins in tissue near the diaphysis, then affects the diaphysis, and lastly the chondrocalcareous layer. When general, the strength of the bone is affected and fractures may result. Its color varies from light cherry to a currant red, and it is of jellylike consistency. Parrot thinks rachitis rare before the sixth month of life. He lays down the differences between *syphilis* and *rachitis* as follows:

SYPHILIS.	RACHITIS.
1. No spongy tissue.	1. Spongy tissue.
2. Osteophytic osseous layers.	2. Peripheric spongy layers.
3. Augmentation of the diameter by these layers.	3. Augmentation of the diameter due to spongy tissue.
4. Osteomalacia and decalcification hardly marked.	4. Osteomalacia and decalcification considerable.
5. Gelatiniform degeneration, which may lead to separation of epiphysis.	5. Never any gelatiniform degeneration.

As the syphilis progresses these lines of demarcation become less well defined, and the distinctive points, although present, are not as well marked. This table shows them:

SYPHILIS.	RACHITIS.
1. Osteophytic layers with medullary spaces between.	1. No osteophytic layers.
2. Augmentation of the diameter from osteophytic layers and spongy tissue.	2. Augmentation of the diameter by spongy tissue only.
3. Bones flexible but less so than in rachitis.	3. Bones flexible.

It is not necessary to enter into very minute details to prove that the other propositions as laid down by Parrot are untenable, but a few will suffice. That rachitis can not be produced in animals is contrary to what is now known on the subject, for we know it to be a common disease especially in those confined in menageries.

That rachitis does occur in some cases of hereditary syphilis is undoubtedly true, but the syphilis certainly does not always cause the disease. Demme, in Berne, from 1862 to 1868 saw six hundred and forty-eight children affected with rachitis, and in no case was evidence of syphilis found.

Pini, of Milan, reports on 4,176 children affected with rachitis, and believes there is no connection between the two diseases. Syphilis exists in countries where rachitis is unknown. Humboldt failed to see any cases of the latter disease in Mexico or Peru. Waitz never found it in Java. Ernest Martin gives similar testimony as to China and Japan, and all these observers met with cases of syphilis among the natives of these parts.

Fournier, in discussing this question, says: "Agreeing in the main with the view taken by Parrot, that rachitis is frequently met with in persons affected with hereditary syphilis, I would differ from him in regarding it as an unfailing sign of syphilis. I believe that rachitis is the result of a general disturbance imported by syphilis into the organism; or, putting it in other words, that syphilis is a considerable affluent in the production of rachitis, but not the only one."

The superficial lesions of the bones may be caused by extension from the soft parts, and this is especially apt to occur on the skull and in the palate. A syphilitic ulcer destroys the soft parts over the bone, and as a result both the periosteum and the bone are denuded, and superficial necrosis occurs in this manner also; although only one bone may be affected at the onset, the process may extend through the soft parts and eventually several bones become involved. This is seen about the bones of the nose and face. In all such cases, however, the question of mixed infection comes in, and the secondary processes are nearly always due to the bacteria of inflammation. Where meningitis occurs after necrosis of the bones of the face it is usually due to a specific rather than to a purulent meningitis extending from the site of the diseased bone, although the latter does occur.

When the bone lesions are situated near the joints by extension, they may involve the articulations, and a secondary arthritis or synovitis occur.

The results produced by the disease vary with the bones affected, the amount of tissue involved, and the character of the lesion.

Superficial lesions, slight in degree, may leave no signs, or if the skin over the affected bone becomes involved there may be an ulcer, subsequent healing producing a cicatrix. If loss of tissue is great, marked deformities may occur, as is seen in the loss of the bridge of the nose, so frequent after the loss of the vomer and the nasal bones.

Again, by weakening of the bones by gummata, whether in the body of the bone or in the medulla, spontaneous fractures may occur which upon healing may cause deformity.

The addition of new bone in the form of exostoses may also alter the appearance of the parts. These new growths, by increasing weight and by encroaching upon the articulations or interfering with muscular attachments or muscular action, may also cause deformities, such as the flat foot in the case of hyperostosis of the tibia.

Syphilitic Pseudo-Paralysis.—This is a term used by Parrot and others to denote the inability to control muscular movements in those who have suffered, in the course of a syphilitic infection, a separation of the epiphysis from the diaphysis. There is no true paralysis; the muscles react to faradism and galvanism, and the condition is simply such as is found after fractures. The patient is unable to raise the affected limb, usually the humerus or the femur, and unless union again takes place there is more or less permanent disability, and finally atrophy from disuse, and subsequent loss of power in the muscles of the entire limb. The separation of the epiphysis from the diaphysis usually occurs in very early childhood, and when due to a gummatous osteomyelitis, for instance, may be unsuspected until the little patient shows by loss of power of the affected limb that something is wrong. Careful examination will show the true nature of the lesion, the false point of motion, possibly crepitus and shortening, the deformity, the pain, and the pseudo-paralysis.

An interesting case of this kind is related by Behrend and quoted by Sturgis in the Archives for Pediatrics in April, 1888:

> The child came under observation in June, 1880, when eleven weeks old, with a papular eruption of the entire body and a pseudo-paralysis of the right arm. Fourteen days before, the mother had discovered the child's arm was painful on motion, but saw nothing abnormal about it. Examination showed that there was a separation of the epiphysis from the diaphysis of the lower portion of the right humerus. The child was emaciated, its face wizened and senile, and the panniculus adiposus was entirely absorbed. Sublimate baths rapidly induced recovery, and the child increased in weight. Six months later, without any apparent cause, swellings appeared suddenly in the middle of the left humerus and of the left femur, increasing the affected areas to double their normal dimensions and giving rise to great pain. Examination showed fracture of both bones. Splints were applied and mercurial baths given, and at the end of two and a half months the child made a perfect recovery.

Fractures.—In patients affected with syphilis fractures may occur either from a slight traumatism or from severe injuries. From the earliest times it has been known that syphilitic lesions of a destructive character weakened the affected bone. Older writers spoke of osteomalacia, fragilitas, and similar diseases, as being caused by syphilis; but although this may be true, the majority of fractures are not due to such diseases. No special weakening of the entire bony system is found, but usually some local cause for the fracture. A case reported by Bryant (London Lancet, April 23, 1887) well illustrates this point:

> The patient was a female, aged fifty-three, who had syphilitic ulcers on the sternum, the left shoulder, and the leg. In getting up from a chair she felt something in her leg crack, and was unable to walk or stand on the limb. On admission to the hospital there was marked enlargement of the leg beneath the ulcer. Above and below it the skin was clearly defined, dipping down along its margin. At the bottom was a piece of black necrosed bone. The bone was fractured exactly at the seat of the necrosis, and the sequestrum removed measured two and a quarter inches by one inch. The limb was put up in a plaster-of-Paris spica, and a good recovery followed.

Of course, where *mollities ossium* or *fragilitas ossium* exists, fractures are more likely to occur than in normal bone. A case reported by Marcellus Donatus, in 1536, is possibly one of osteomalacia due to syphilis. The patient, while throwing half an orange to some companions, sustained a fracture of the right humerus, which however united promptly; but subsequently, in reaching from the bed for a vessel near by, he sustained a fracture of the left humerus, which also rapidly united. The traumatism in both these cases was very slight, but we know fractures do occur from muscular action.

These fractures unite as perfectly and as rapidly as those in normal bone, especially if proper antisyphilitic remedies are combined with the local treatment. In all cases such remedies should be used although all active signs of the disease may have disappeared, for the rapidity and perfection of union may possibly thereby be increased. The callus in such fractures does not differ from that in nonspecific cases. Many such fractures have been reported and subsequent autopsies made, showing the above fact. The following case is of interest, and is by Tavernier, in Les Annales de Dermatologie et Syphilis, Paris, 1887, 2me séries, viii, p. 177:

> The patient was a female whose husband was syphilitic. She acquired the disease six years prior to her admission to the hospital. She had suffered from severe pains in the head and from skin lesions, but had been delivered of one healthy child. There was found, on examination, a node on her right clavicle, at the junction of the middle and inner third, the size of a hen's egg. On the middle third of the left humerus was a node of the same size as that on the clavicle, and on the lower end of the right humerus was a node, the size not given. She was treated from October 30th to November 10th; then, while turning a pillow, she broke the right humerus in its lower third. She was given appropriate treatment, and the arm rapidly united.
>
> One year later she died of hæmorrhagic smallpox, and the autopsy showed the callus to be normal and the union perfect. The node on the right

clavicle had disappeared, that on the left humerus was scarcely perceptible, and that on the right reduced about three fourths.

Nonunion does not seem to be more frequent after fractures in patients affected with syphilis than in those not so affected, nor is delayed union common.

Diagnosis.—The diagnosis of bone syphilis has to be made after a careful examination of the bones involved and a thorough history of the case.

Pain is the one symptom of great value. It is usually nocturnal in character, at least it is always worse at night, except in rare instances. In some cases the pain is almost unbearable, in others it is comparatively slight. The pains have been spoken of as "osteocopic," and by many are supposed to be due to the warmth of the bed, for they may often not be felt until the patient retires. In the cases of those whose occupation is night-work the pains may be felt when the patient is in bed—that is, by day only. The rule, however, is, that although the pains may be more severe after the patient has retired, they are not entirely relieved by his rising during the night, and only diminish markedly in severity with the advent of another day. The pain may affect the entire length of a long bone, or the entire surface of a flat one; but as the disease comes nearer to the surface, in cases which go on to suppuration, only the part affected is the seat of the severe pain, although the entire bone may be painful.

The character of the pain has been variously described. Some say it is as if heavy blows were being given the limb, as with a hammer or some other blunt instrument. It is usually deep-seated. When it is so severe as to cause much loss of rest, unless the patients sleep by day, other symptoms may follow, such as weakness, nervousness, and disturbances of digestion. As a rule it is increased by pressure, but in exceptional cases this is reversed. By manipulation we may sometimes determine at just what point the disease is most active, for the pain is generally a very early symptom, frequently appearing before any increase in the size of the bone has been noted.

In cases where disease of the bones of the skull is limited to the inner table the pain may be the only symptom; and where we meet with patients suffering much pain, nocturnal in character, we should always carefully examine for any specific disease. When the nerves are pressed upon the pain may be felt at some distance even from the skull. In hereditary syphilis in very young children pain is not as valuable a symptom as it is in adults; although present, it is probably not as severe. The pain due to the involvement of the soft parts when abscesses form may be very severe in character, but is different from the osteocopic pains. The effects of treatment are first seen in the diminution of this symptom.

The *constitutional symptoms* vary with the age of the patient. In hereditary syphilis of young children, although at birth the child may appear healthy and well nourished, when bone disease appears the child becomes peevish and irritable, loses flesh, may refuse to nurse, sleeps poorly, and has a wizened and prematurely aged appearance. Usually at or about this time other symptoms appear. Mucous patches may be seen about the mouth; there are eruptions on the face or the skin of the body, and eye symptoms may be noticed. The liver and spleen become enlarged, and the various superficial glands are also increased in size. A thin irritating and ichorous discharge occurs from the nares, known as the "snuffles." If suppuration occur, the temperature may be raised, and we have the usual signs of inflammation at the site of the lesion. In later life the constitutional symptoms are less marked, the liver and spleen are not as constantly enlarged, and other symptoms have usually preceded the bone lesions.

The *previous history* of each parent must be investigated as well as that of the child. If syphilis is admitted by either parent as having existed prior to the birth of the child, and the bone lesions are of the character met with in that disease, a diagnosis is easily made; but where syphilis is denied, what other symptoms of importance exist? Among the most important are miscarriages by the mother, for so frequently is syphilis a cause of nonviability and premature delivery, that whenever a woman repeatedly miscarries or gives birth to a dead child suspicion of this disease may be justly entertained. Carpenter states that, of six hundred and fifty-seven syphilitic females, two hundred and thirty-one miscarried, while four hundred and twenty-six were delivered at term of living children.

Kassowitz asserts that one third of all children procreated of syphilitic parents are stillborn, and that thirty-four per cent of those born living die within six months.

Miller analyzed one thousand cases, and found sixty-four per cent of the mothers miscarried during the first month, and twenty-two per cent during the second. Other statistics could be quoted giving corroborative data. The previous family history should be carefully considered. Iritis, deafness, loss of hair, sore throat, osteocopic pains, eruptions on the skin, are severally and collectively factors, the importance of which should be fully appreciated in doubtful cases.

Where bone lesions appear after the fifth year of age it should be remembered that other symptoms have usually entirely disappeared, perhaps leaving no trace of their pre-existence, and details as to previous symptoms must therefore be carefully sought for.

The Teeth.—Hutchinson, in 1863, described certain abnormal conditions of the teeth in patients affected with hereditary syphilis, and stated that these changes were more marked and constant in the permanent than in the temporary teeth.

A careful study of the pathological processes is important, for, although the conditions are not pathognomonic, they may be of great aid in diagnosis in doubtful cases.

Dentition is found to be delayed, or the character of the teeth changed, or the teeth may be smaller than usual. Demarquay has recorded cases of syphilitic children in whom the teeth had not appeared at the fourth year; and Lancereaux describes a case where at twelve years of age the lateral incisors and canines had scarcely emerged from the alveoli; and Fournier says they may not appear until the fifteenth year. The teeth, then, in the syphilitic appear later than usual. The characteristic Hutchinson teeth, however, have their structure changed by erosions, causing a notching of their free edges.

The Eyes.—Existing disease of the eyes must be carefully examined, as it may constitute a useful factor in diagnosis. Opacities, iritis, retinitis, and ulceration of the eyelids may all be caused by syphilis, and, although active symptoms may not be present, an inquiry may elicit the fact that they have previously occurred.

The Ear.—Affections of the ear are frequent in hereditary syphilis, and where suppuration has occurred, followed by perforation of the tympanum, examination will reveal the previous lesion, and the deafness which may be present will also be suggestive.

The Skin.—If any eruption is present at the time of the examination usually by its character and its appearance it can be decided whether it is due to syphilis or not. If the eruption has disappeared, it may have left traces of its previous existence, and we should endeavor to ascertain, as nearly as possible, its character. If pigmentation of the skin remains, or scars are found, their nature and extent must be considered.

The Mouth, Nose, and Throat.—All these should be carefully examined for any signs of active disease, or for cicatrices suggestive of specific trouble.

Arrest of Development.—This is a symptom occasionally found in those suffering from hereditary syphilis. The patients may look younger than they really are, and in addition may be poorly developed, mentally as well as physically. In the female the genitals may be small or atrophied, the mammæ but slightly prominent, menstruation delayed, and the growth of hair on the mons veneris and axillæ very slight.

Effects of Treatment.—The exhibition of mercury and of the iodide of potassium will often assist toward making the diagnosis. Though these drugs do in some instances act favorably on tuberculous and other lesions, their effect is usually not as rapid or as well marked as in cases of syphilis. Still, too much reliance must not be placed upon the therapeutic test, and if recovery fails to take place at once under antisyphilitic remedies the physician must not too hastily assume an error in diagnosis. Then, again, when local lesions have been improved, as in cases of ulceration of the soft parts and the bone, by proper cleanliness and surgical treatment the change must not be ascribed to the antisyphilitic remedies instead of the local management of the case. While the remedies are being given in doubtful cases, it is well not to conclude too hastily, because the patient improves, that the disease was syphilis.

Other Symptoms.—The joints, the nervous system, and the viscera may be affected by syphilis, and a thorough knowledge of the disease is necessary to carefully investigate these points in connection with bone lesions of doubtful origin.

The Spleen.—This organ is so frequently enlarged, especially in inherited syphilis, that in young children we should always examine it. Fox and Ball, in an article on Hypertrophy of the Spleen in Infants (Jour. Brit. Med. Association, April 23, 1892), say that, in 175 cases of inherited syphilis, in 75, or 48·4 per cent, the spleen was found by palpation to be enlarged at some time or other, and this result agrees well with Gee's conclusions. Barlow thought the percentage still greater. Haslund, in 154 necropsies, found the spleen enlarged in 38 per cent. In 44 cases of adults with acquired syphilis the spleen was enlarged in 27. Weber gives 75 per cent, and other observers might be quoted. We thus see that the diagnosis involves a careful and thorough examination of the patient for any present or previous evidences of syphilis, and in hereditary cases a similar examination of the parents.

Differential Diagnosis.—Syphilitic osteitis may be mistaken for tubercular osteitis, for rachitis, for malignant growths, and for simple osteitis due to traumatism. Osteoperiostitis of specific origin must be diagnosed from the nonspecific, and osteomyelitis due to gummata from acute osteomyelitis.

Although open to some objections, perhaps the clearest manner in which to contrast these various diseases is by means of tables. In the preparation of these tables some points may be included which are of doubtful value; but any and every symptom is of value, and should be considered in doubtful cases. The diagnosis between syphilitic osteitis and that due to tuberculosis is as follows:

SYPHILITIC OSTEITIS.	TUBERCULAR OSTEITIS.
1. Previous history of syphilis.	1. No such history.
2. Usually affects the shafts of the long bones, rarely the epiphysis and the neighboring joint.	2. Usually affects the epiphysis and the neighboring joint, rarely the shaft.

3. Often affects the bones of the cranium and the face.	3. Rarely affects the bones of the cranium and the face.
4. Other symptoms of syphilis present.	4. No such symptoms present.
5. Indications of previous syphilitic disease, such as notched teeth, etc.	5. No such indication.
6. Osteocopic pains referred to the bone affected.	6. Pain referred to the neighboring articulation rather than to the bone.
7. Has a tendency to the formation of new bone, which may subsequently break down.	7. Has a tendency to the destruction of bone.
8. Abscesses, if present, usually small and acute.	8. Abscesses may be very large, are not acute; cold abscesses form slowly, and may give rise to few if any symptoms.
9. Pain worse at night, usually continuous.	9. May be worse at night, but is different in character. The "night cry" of joint disease is peculiar. The child cries suddenly or moans in sleep, and then is quiet again; the pain is not continuous.
10. Pain not relieved by traction or position.	10. The pain usually relieved by traction, or perfect immobilization, or placing the limb in a certain position.
11. No symptoms of tuberculosis.	11. Other symptoms of tuberculosis may be present.
12. Lesions often symmetrical.	12. Rarely so.
13. Frequently more than one bone affected.	13. Rarely so.
14. Microscopical and bacteriological examination give negative results.	14. Microscopical and bacteriological examination show the presence of the bacilli of tuberculosis.
15. Inoculation experiments may be negative.	15. Inoculation experiments may prove the existence of tuberculosis, even where no bacilli were found.
16. The bone is usually increased in size.	16. Rarely much increased.
17. Increase of temperature rare.	17. Increase of temperature common.
18. Amyloid degeneration of liver, spleen, and other organs rare.	18. A common result in bad suppurative cases.

19. In the majority of cases proper antisyphilitic remedies arrest or modify the disease.	19. No such effect.
20. General glandular enlargement common.	20. Not so common.
21. Gummata usually terminate in caseous degeneration.	21. Tubercles frequently undergo caseous degeneration.
22. Gummata usually larger than tubercles.	22. Tubercles usually smaller than gummata.
23. When new bone is formed, sclerosis and eburnation common.	23. No such results. Bone tissue destroyed not usually reproduced.

When the two diseases exist at the same time, or one follows the other, the diagnosis may be very difficult, but as a rule it can be made by a careful study of the case. It has not seemed necessary to divide the subject under the heads of hereditary and acquired syphilis, as under the head of pathology the forms affecting each variety were discussed.

In very young children the diagnosis of specific osteomyelitis has to be made from acute osteomyelitis or the acute arthritis of infants.

SYPHILITIC OSTEOMYELITIS.	ACUTE ARTHRITIS OF INFANTS.
1. History of syphilis in parents or child.	1. No such history.
2. Other symptoms of syphilis.	2. No such symptoms.
3. Formation of abscess and destruction of bone slow.	3. More rapid usually.
4. Use of antisyphilitic remedies beneficial.	4. No such result.

Both diseases are rapidly fatal unless proper treatment is begun early, and a differential diagnosis is often very difficult.

The differential diagnosis between syphilitic osteitis and rachitis is as follows:

SYPHILITIC OSTEITIS.	RACHITIS.
1. Previous history of syphilis, or evidences of existing disease in child or parents.	1. No such history.
2. Affects principally the shafts of the long bones.	2. Affects principally the epiphyseal ends of bones.
3. Rarely affects the ribs.	3. Commonly affects the ribs.
4. Bones of skull when affected usually show nodes.	4. Bones of skull when affected usually show thinned condition of cranio-tabes.

5. Fontanelle may close, as in cases where no disease exists.	5. Closure of fontanelle usually delayed.
6. Long bones when bent are thickened.	6. Long bones when bent not thickened; may be thinner than normal.
7. Crests of tibiæ when affected always larger and broader.	7. Crests of tibiæ when affected usually thinner (see illustration 13).
8. No symptoms of rachitis present.	8. Symptoms of rachitis present, such as prominent abdomen, beaded ribs, pseudo-paraplegia, bowlegs, knock-knees, etc.
9. No cachexia present.	9. Cachexia present.
10. Results of antisyphilitic remedies beneficial.	10. No effects from such treatment.
11. May disappear and leave no trace of deformity.	11. Always leaves more or less deformity.
12. Osteocopic pains, and pain worse at night.	12. No such pains.
13. Lesions often terminate in destruction of bone.	13. Do not so terminate.

From malignant tumors or other tumors of bone the diagnosis may have to be made. This usually, however, is rare, and only in the early history of the case:

SYPHILITIC OSTEITIS.	TUMORS OF BONE.
1. History of syphilis.	1. No such history.
2. Evidences of an existing or a previous syphilis.	2. No such evidences.
3. Lesions generally multiple.	3. Rarely so.
4. Growth slow, not excessive.	4. Growth in benign tumors may be slow, in malignant may be rapid. Size attained is greater.
5. Osteocopic pain, and worse at night.	5. May be painless.
6. Beneficial results of antisyphilitic remedies.	6. No such results.
7. Microscopical examination negative.	7. Microscopical examination shows the character of the growth.
8. No cachexia.	8. Cachexia usually marked in malignant tumors.
9. General lymphatic system involved.	9. Not always involved.

10. Lesions often terminate in destruction more or less complete of bone.	10. Do not so terminate.

From periostitis or osteoperiostitis due to traumatism, the following symptoms are of value.

SYPHILITIC OSTEOPERIOSTITIS.	NONSYPHILITIC OSTEOPERIOSTITIS.
1. May occur in infants.	1. Rarely in infants.
2. History or evidence of syphilis in parents or child.	2. No such history.
3. History or evidence of syphilis in the patient.	3. No such history.
4. Usually more than one bone involved.	4. Usually only one bone involved.
5. No history of traumatism.	5. History of traumatism.
6. Local symptoms comparatively mild.	6. Local symptoms marked.
7. May terminate in abscess.	7. Frequently terminates in abscess.
8. Progress of the disease usually slow.	8. Progress of the disease usually rapid.
9. Beneficial effects of proper anti-syphilitic treatment.	9. No such effects.

Prognosis.—Prognosis in bone syphilis must be based on the age of the patient and the amount and character of the disease.

In very young children the mortality is high; the bone lesions are usually only one indication of the disease, other parts, such as some of the viscera, being at the same time affected. If suppuration be added to the specific disease, the children may die of sepsis, but this is rare.

The changes in the bone may lead to subsequent deformities, as where an epiphysis and a diaphysis become separated, a flail joint may result, or by union in a faulty position in such cases more or less permanent deformity may follow.

Sturgis, in the Archives of Pediatrics, v, 237, gives the statistics of the Moscow Hospital from 1860 to 1870, where, of 1,938 children born with syphilis, 1,425 died. Etienne, quoted in the Medical Record for February 4, 1893, gives the mortality of infants born of syphilitic mothers who had not been subjected to mercurial treatment as over seventy-six per cent at birth, and over ninety-five per cent when the few children born alive are kept under observation. When the mothers have been subject to anti-syphilitic treatment this mortality drops to from eleven to sixteen per cent. If the treatment is pushed during the course of pregnancy, statistics show it is reasonable to hope that very few if any of the children will perish. This does not give the result in cases of bone lesions, but the general results. Hereditary bone syphilis occurring later in life is *per se* rarely fatal.

In acquired syphilis lesions of bone may be followed by serious results. When the bones of the skull or face are affected, deafness, hemiplegia, neuralgias, blindness, and other troubles may result. If meningitis occur it may be rapidly fatal if suppurative in character. The prognosis as to recovery from disease of the long bones is good, but it is only when the cases are seen early that the size of the bone affected can be reduced by treatment. Gummata in the periosteum and the bone may disappear, but if formative osteitis has occurred the exostosis or hyperostosis usually remains, or is only slightly reduced in size. In none of the cases seen by the author has much reduction in size occurred, although such cases have been reported by competent and trustworthy observers.

Treatment.—The indications for treatment in bone syphilis are, first, to treat the constitutional disease; secondly, its local manifestations in the bones. Appropriate remedies for the constitutional symptoms are such as are used in syphilis affecting other parts. The iodide of potassium and mercury, either singly or in combination, internally, mercury externally in the form of oleates, ointments, or baths, are the remedies indicated. Tonics, good hygienic surroundings, nourishing food, and suitable medication for any intercurrent affections, are necessary. As for the local conditions, the general indications are to relieve the pain, promote healing if the lesions are destructive in character, to control, if possible, any tendency of the disease to spread to the neighboring tissues, and to prevent and overcome deformity.

In gummata affecting the periosteum, or even the bone, if the swellings present as soft tumors, even though the skin above be reddened and glazed in appearance, it is best not to open them unless suppuration has actually taken place. These tumors disappear under appropriate internal and external medication, and if bony formation has occurred nothing is gained by incising them. If suppuration supervenes or an abscess forms, then open freely, thoroughly scrape out, and treat on general surgical principles.

If the pain is severe and not relieved by internal treatment, an incision through the periosteum will often afford the desired relief, or in cases of gummatous osteomyelitis it may be necessary to trephine the bone. This is only indicated where the incision through the external parts of the bone does not relieve the pain, and where, from increase in size of the bone, it is recognized that the medulla is affected. When sequestra form, care should be exercised in their removal that they are entirely freed from the surrounding bone. In syphilis they are apt to separate slowly, and if an operation is prematurely undertaken too much tissue may be removed, or in some cases only the partly loosened portion taken away, and the disease, not being arrested, a subsequent operation has to be performed.

When an epiphysis has been separated from a diaphysis, the same indications exist as in fractures. Correct the deformity at once, retain the limb in proper dressings, apply suitable splints or apparatus, and get union in the best possible position. Where superficial or deep necrosis has occurred and the parts are covered with unhealthy granulations, these should be removed, the parts made surgically clean, and the healing promoted in the usual manner. In all cases where the necrosed tissue acts as a source of irritation, remove it. Until this is done healing will not take place. This is especially important about the nose and face, as in these parts disease spreads from one bone to the other. By means of the surgical engine and bone drills the diseased bone can be removed, the parts thoroughly irrigated, proper dressing applied, and recovery ensue. Care should always be taken about the face and skull to limit the suppuration as much as possible, as by extension within the skull a fatal result from meningitis may ensue.

Where bony tumors press on nerves and thus cause painful neuralgias, if under proper medication they do not decrease in size and the pain continues, then their removal is indicated. This, however, rarely occurs. To overcome the deformities produced by the disease is often a matter of great interest and difficulty. Of course, if bones have been fractured and deformity ensue, a suitable osteotomy will generally correct it. The most troublesome deformities, however, are about the face, and as the soft parts have often been extensively destroyed and replaced by cicatricial tissue, extensive plastic operations may be required, or unfortunately the destruction may be so great as to prevent anything being done, as in the case of Dr. Bulkley's, referred to in this article.

Where the nose is sunken, several plans may be adopted to overcome the deformity—the best, according to Weir, in an article on this subject in New York Medical Journal for October 22, 1892, being those of König as modified by Israel, and the use of a platinum support devised by Martin.

DACTYLITIS SYPHILITICA.

In the tertiary stages of acquired syphilis, and at any time in those suffering from hereditary disease, the fingers or toes may be the seat of gummatous infiltration, either in the connective tissue and fibrous structures of the joints or in the periosteum or bone.

The disease under consideration has also been described under the name of SYPHILITIC PANARIS; but, if used at all, this term should properly be limited to affections of the soft parts, and the appellation *dactylitis* used where deeper tissues are involved. It is derived from the Greek word δάκτυλος, digit or finger.

Up to the time that R. W. Taylor wrote his classical article on the subject in 1871 only five cases had been recorded, but since then many observers have reported cases, and the affection, though rare, is well recognized.

The pathology does not differ in the acquired or hereditary cases, except that in hereditary disease the lesions often occur in early childhood, and, as in other bone lesions, in early life the tendency to degeneration is greater, and the destruction of soft parts and bone may be marked. The phalanges of the fingers are more often attacked than those of the toes; and while cases have been reported of every finger, and of the thumb, yet the middle and ring finger are more often involved than the others. Fox says it is rarer in acquired than in hereditary syphilis.

Two varieties of the disease are described. In *the first variety* the subcutaneous connective tissue, as well as the fibrous structures of the articulations, are involved; in the second, the disease begins in the periosteum or bone, and may secondarily involve the joint. The subcutaneous connective tissue may or may not be involved. As we might expect, the clinical history differs slightly in the two varieties. Unlike gummata—seen, for instance, in the muscles, forming a well-marked tumor—when the subcutaneous connective tissue is first involved no distinct tumor can be made out, and in many cases the gumma seems adherent to the skin, or the gummatous material may be simply found through the connective tissue. One phalanx only may be involved, or two or three; the joint at the end of the phalanx may be affected or not.

The dorsal surfaces are more prone to the process than the palmar or plantar. The size of the part affected is increased, and this may gradually shade off into the soft parts of the hand or foot, forming a ridge or ring. The rapidity of growth varies. In all cases, whether developed rapidly or slowly, it is essentially chronic in character, and may even resist prolonged antisyphilitic treatment. At times the disease may disappear almost completely and then recur. The tendency is to disappear under treatment, and this occurs as a rule without the formation of abscesses. The gummata may break down, but they rarely suppurate.

When this form of dactylitis occurs the skin over the part affected is purple or violet in color, and the parts may feel tense and resisting or soft and yielding, suggestive of fluctuation. As the gumma is absorbed, the color of the skin changes and gradually resumes the normal.

The nails usually escape, even though the tissues about the last phalanx may be involved. In rare instances the tissues between the fingers may ulcerate, but this is due to the distention of the parts from the disease of the first phalanx. The fibrous structures about the joints are involved secondarily, and are due to an extension of the process. The ligament, especially that portion forming the capsule of the articulation, becomes involved, gummata develop in the form of small tumors, so that when repair takes place the entire ligament is not destroyed, but only that portion in which the tumors formed.

The part destroyed is replaced by new tissue, and, as is often the case with such formation, it may contract, and thus bind the fingers more closely than they normally are, and produce impairment of motion or even deformities. The finger may be either overflexed or overextended at the particular joint involved. The existence of disease in the ligaments may have an effect upon the tissues beneath and interfere seriously with the nutrition of the cartilage and the synovia, or even the bone. Synovitis, however, is rarely the result. Crepitation may be noted, and, when present, is possibly due to changes in the cartilages at the articular ends of the phalanges, causing erosion. The favorite site for this form of dactylitis is the first phalangeal joint, and it is seen either early or late in the tertiary stage of the disease, and usually exists in connection with other lesions of syphilis.

The changes produced in the joint when erosion occurs may result in anchylosis or serious impairment in joint function.

In the *second variety* of dactylitis syphilitica the changes begin in the periosteum or bone; there may exist periostitis, osteitis, or osteomyelitis. The production of gummata causes increase in size of these tissues, and a marked enlargement of the phalanx or phalanges involved. The soft parts are stretched and tense, the skin is reddened and at times very sensitive to the touch. The increase in size of the bone is due to the same causes as the increase in the larger bones when affected with syphilis.

If the periosteum is first involved it becomes swollen, thickened, and may be loosened from the underlying bone; gummata form within it or between it and the bone, and we soon have as a result either the production of small tumors, which may break down or cause permanent thickening as the result of the periostitis that occurs. When the gummata set up an osteitis there is first the rarefying form of the disease, which causes destruction of the bone involved and subsequently formative osteitis, which to a certain extent replaces with new tissue the portions destroyed. The destruction may be limited to the surface of the bone, or the formative osteitis, by causing pressure on the blood-vessels and destroying circulation, may give rise to necrosis.

The gummata, when broken down, appear as yellowish fluid of varying consistency, at times even cheesy in character. This gradually comes to the surface, and either at this time or earlier mixed infection may occur and pus be found. When this takes place more or less destruction of the soft parts usually ensues. In the fingers and toes the process generally extends to the neighboring joint or joints, and synovitis or arthritis is present.

Under proper treatment the gummata may entirely disappear, or the periosteum and bone involved may show permanent changes. From the formative osteitis they may be increased in size at certain parts, and from the rarefying osteitis diminished. Decrease in size, as a final result, is the most common, and the length or thickness of finger may be altered. The joints may be destroyed and false joints occur, or, in rare instances, anchylosis. These false joints are due to the fact that the gummatous infiltration has caused a solution of continuity in the shaft of the bone, and nonunion has resulted. The phalanges being short and the joint proper also being destroyed, this is an accident that may seriously impair the utility of the finger.

When new bone has formed, as in formative osteitis in other bones, the new tissue may be harder and denser. Sclerosis and eburnation occur, so that, although diminished in size, the bone may be nearly as firm as ever.

When the medulla is involved at the onset the symptoms are generally more acute, the pain more severe, and the increase in size of bone greater and more rapid. In rare cases a gumma in the medulla may become surrounded by new bone and remain without causing any very marked symptoms.

Symptoms.—In dactylitis syphilitica the symptoms are few; one or more fingers in children suffering with hereditary disease or in persons who are in the secondary or tertiary stages of acquired syphilis, begin to increase in size. This increase usually begins in the shaft of a phalanx, and is more rapid when the disease begins in the bone than when it begins in the soft parts. As the disease advances the soft parts covering the bone become stretched. Changes in color become more livid, and may be bright red, but more usually are a purple or violet hue. The skin may or may not have a glazed appearance. When the swelling is very marked, ulceration is apt to occur, a discharge of the broken-down gumma takes place, secondary pus infection occurs, and we have as a result an ulcer or a sinus. The pain accompanying the disease may or may not be severe, but, like other pains in bone syphilis, is usually worse at night.

Fox makes the statement that the disease is rarer in acquired than in hereditary syphilis, and, although it may be correct, the majority of reported cases are in adults. As in bone syphilis affecting other bones, the lesions are frequently multiple, and other symptoms of syphilis may or may not be present.

In hereditary disease the lesion appears during the early years of life. In acquired syphilis many years may elapse between the chancre and the dactylitis.

Olmstead (Southern Med. Record of Atlanta, vol. xx, p. 56) reports a case of an infant twenty-two months of age, in which the first phalanx of the ring-finger of the right hand was involved, and the first and second phalanges of the same finger on left hand. The development of the symptoms was slow, and the skin was not discolored. At the largest part the right ring-finger measured four and a quarter inches. The teeth were notched. The post-cervical and occipital glands were enlarged, and the head was large. Whether any hydrocephalus was present or not is not stated. The toes showed a tendency to enlargement, but no actual disease was made out. Under proper treatment a cure promptly ensued.

In a case reported by Deakin (Indian Medical Gazette of Calcutta, 1878) the syphilis is said to have occurred eight years previously, and in this patient the palmar and outer surface of the right thumb, chiefly over the metacarpal bone and extending over the joint to the metacarpus, was the region involved.

In a case reported by Fox (Journal of Cutaneous and Venereal Diseases, 1882) the disease occurred three and a half years after primary infection. This patient had a gumma of the right forearm, in addition to the dactylitis of the right middle finger.

The multiplicity of the lesions is also well illustrated in the case referred to by Wigglesworth (Boston Med. and Surg. Jour., May 9, 1872), in which there were nodes on the tibia and dactylitis of the first phalanx and the joint of the left ring-finger, and of the great and second toes at their second phalanges.

As a good example of the hereditary form the illustration of the case reported by Taylor (Archives of Scientific and Practical Medicine, April, 1873) is here introduced:

The patient was a female, six months of age. At birth she presented no lesions of the skin, and was apparently a well-developed child; but when a month old she was afflicted with a roseola, mucous patches, and snuffles, all of which disappeared, and were replaced by a general papular syphilide. When the child was six weeks old its mother noticed that its right middle finger was enlarged, but she could not obtain any evidences of pain. The enlargement slowly increased for two months, when the skin covering the first phalanx became slightly red and thickened, and tender and very tense from the pressure within. This inflammation of the integument and enlargement of the bone progressed very slowly; and at the end of ten weeks, which would be the fourth and a half month of the existence of the trouble, fluctuation was discovered, and an incision made by a surgeon on each side of the finger, with the result of liberating a considerable quantity of pus. At this time the patient came under treatment. The right hand presented the appearance shown in the illustration (Fig. 14), which is taken from a cast made from life. The middle finger was greatly swollen, being fully an inch in all diameters and having a circumference of two and three quarter inches. The finger was very markedly flexed, and could not be extended—a fact which was due to the tension produced by the swelling of the bone on the flexor tendon. This condition, which I have also observed in two other similar cases, continues as long as the swelling is great, and consequently disappears very slowly. The fore and ring fingers were very much separated, and were rendered unwieldy by their abnormal position. This was very noticeable when the child clasped any small article between the thumb and forefinger. The ulcers which resulted from the incisions had a sloughy base, similar to that observed in ulcerating gummata, were surrounded by a livid, undermined edge, and they secreted considerable quantities of sanious pus. There was no evidence, nor had there been, of spontaneous pain, but the finger was sensitive to handling, as evidenced by the distressed look of the child's face. According to the mother's statement, the child nursed and slept well, and its strength was not impaired. I immediately placed the mother on half-grain doses of the protiodide of mercury twice a day, with five grains of the citrate of iron and quinine before each meal. Her mucous patches were treated locally, and I applied faradization to the contracted arm.

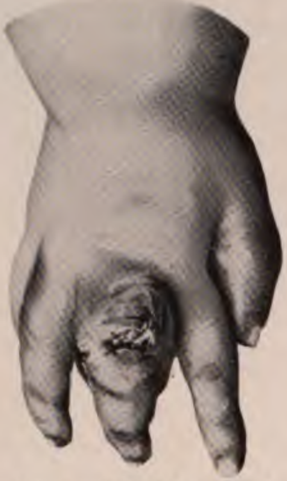


FIG. 14.—Syphilitic dactylitis. Inherited. (After Taylor.)

For the child I ordered a grain of the hydrargyrum cum creta three times a day; and, after slightly penciling the surface of the ulcers with nitrate of silver, I ordered an ointment composed of ung. hydrarg., two drachms; ung. simpl., six drachms. During the month of June very little change took place in the finger, which was fully as large as ever, but the cutaneous and mucous lesions had disappeared.

At the end of July it was noticed that the ulcers discharged less, that their edges were less everted, and that there was a diminution in the circumference of the phalanx of one quarter of an inch. During the month of August there was also an improvement, and the finger was an eighth of an inch less in circumference, and during this month the child had not taken the powders more than ten days, in consequence of gastro-intestinal disorder. At this time the mother was greatly improved in health, her strength being nearly normal, having no mucous or cutaneous lesions, and she was able to flex or extend the arm, and the biceps muscle was as large as its fellow.

The case progressed favorably during the months of September, October, and November, for during this period the bone became ma kedly less swollen. The ulcers, however, did not wholly heal, and required stimulation about once a fortnight, as exuberant granulations appeared on their floor. Early in January the ulcers had fully healed, leaving a depressed, thin cicatrix on each side of the finger, which was adherent to the bone. At this time the finger presented the following appearance: It was three eighths of an inch longer than its fellow of the other hand, owing to an elongation of the first phalanx, which was flattened laterally, so that its transverse diameter was a little less than half an inch, while its antero-posterior diameter was about three quarters of an inch. The mobility of the finger seemed perfect, and the child was able to grasp any article with the hand with normal power.

In another case by Taylor the child was four years and four months old, and the parts affected were the lower end of the right radius, the upper end of the left ulna, and the metacarpal bone of the index-finger of the right hand. The metacarpal bone was greatly enlarged, and presented to the feel a perfectly oval form. It was about an inch and a quarter in diameter at its middle, and then shaded off gradually on each end. It completely filled up the triangular space which exists normally between it and the metacarpal bone of the thumb, and its enlargement was also visible upon the palmar surface of the hand. It was painful to manipulation, but there was no lesion of the skin, though this structure was stretched considerably over it (Fig. 15).

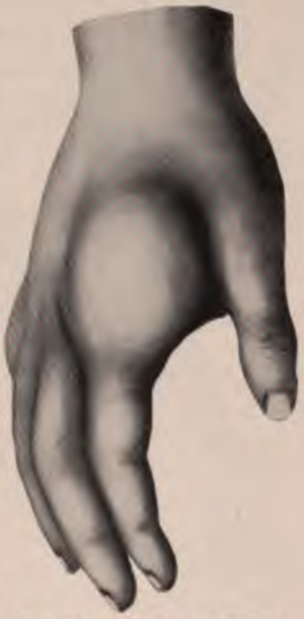


FIG. 15.—Syphilitic dactylitis. Acquired. (After Taylor.)

In this child the syphilis was acquired by kissing its baby sister, who had mucous patches.

The appearance of the fingers, when dactylitis of hereditary form causes destruction of bone tissue and subsequent shortening, is well seen in the case of Volkmann, quoted by Taylor:

The patient was a girl, who at fourteen had a swelling of the upper part of the left ulna, and at her twentieth year a swelling in the right wrist, left knee joint, and left ankle. Two years after this her right foot swelled; but the skin over the joint was not involved. Motion gradually became impaired, until a fixed and slightly flexed position was produced. Spontaneous pain did not exist, but the parts were sensitive to pressure. The knee joint recovered its mobility in a year, and the left ankle joint in about five years, whereas the affection ,in the right ankle disappeared, and then recurred with greater severity. This was coincident with pain in the head and limbs. Very soon nodes appeared upon the shafts of the tibiæ and on the frontal protuberances. The swelling in the right wrist extended after a few weeks over the dorsum of the hand, involving the first and second phalanges of the thumb and the three adjoining fingers. The thumb and the second and third fingers recovered their normal condition in about three months, but the integument of the index-finger gradually reddened upon its radial side, and in about a year opened and discharged a little pus, but no bone; then closed, leaving the motion of the finger impaired. In her twenty-eighth year a swelling appeared upon the ulnar side and dorsal surface of the left hand, which, becoming red, extended to the integument of the first and second metacarpal bones. An incision was made into this swelling, which gradually enlarged into a circular ulcer. This healed slowly, leaving a fistula at the base of the metacarpal bone, which healed later on. In the following year (the patient then being twenty-nine) the first phalanx of the thumb of this hand enlarged, and in a year the last phalanx also became enlarged. Coincidently the first phalanges of the first and second fingers and the whole of the right toe became enlarged. The course in these cases was more acute, and necessitated several incisions. She had been unsuccessfully treated with non-specific remedies for sixteen years previous to January, 1869. At this time her condition was as follows: The body was ill nourished; there were no cutaneous lesions nor enlargement of the lymphatics, but upon the frontal tuberosity were several nodes; the spleen was very much enlarged; the right wrist was slightly

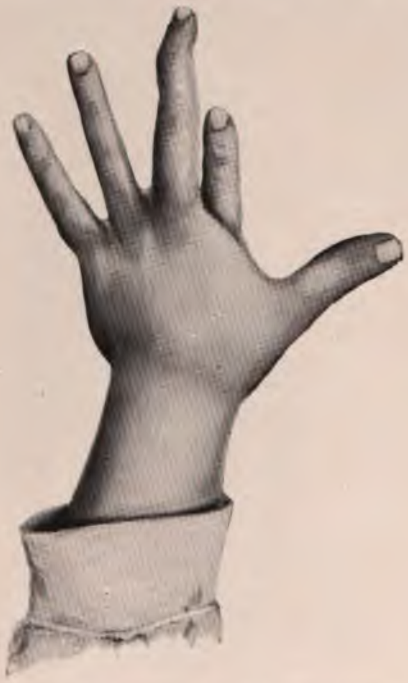


FIG. 16.—Syphilitic dacytlitis. Inherited. Showing loss of tissue and shortening of finger. (After Volkmann.)

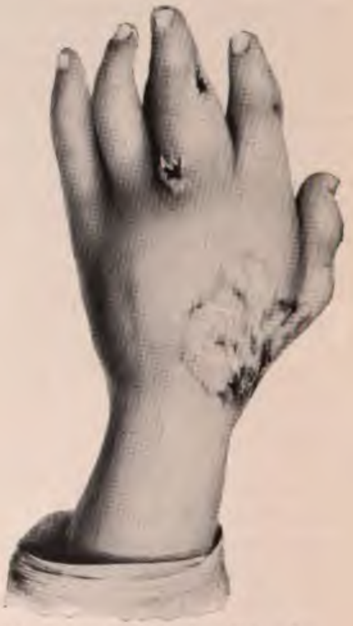
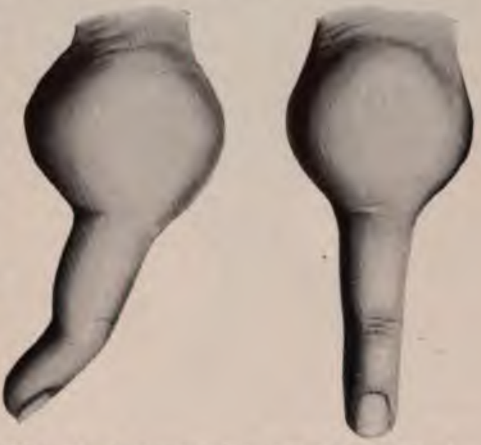


FIG. 17.—Syphilitic dactylitis. Inherited. (After Volkmann.)

flexed and fixed, and the styloid processes were prominent; the integument over the affected points was tense, and in some spots livid; the cicatrices and fistulæ were small, and situated upon the dorsal surface of the hands; when a probe was passed into the fistulæ a spongy tissue was felt, but no denuded bone.

The right hand (Fig. 16) showed the results of the destructive process; the first phalanx of the index-finger was considerably shortened, and so constricted at its center, where a small cicatrix was seen, that the bone appeared to be divided into two pieces, and the patient had to fix the finger with a glove, so great was the mobility. The two other phalanges were normal. The middle finger was much emaciated, the second phalanx was in a position of superextension, while the first was slightly fixed. The bones, though unchanged in form, were atrophied, and the integuments, joints, and tendons were normal.



FIGS. 18 and 19.—Syphilitic dactylitis. Acquired. (After Berg.)

In the left hand (Fig. 17) the lesion was in progress; on the dorsum was a large, smooth, movable cicatrix, adjoining a small, retracted spot at the base of the first metacarpal bone, which atrophied and produced a marked shortening of the thumb. The first phalanx of the middle finger was very much swollen and obliquely perforated by a sinus, and the bone was completely divided into two parts by an intervening, newly formed tissue. The two phalanges of the thumb and the first phalanx of the index finger, and the first phalanx of the right middle toe, were smaller, but there was no sinus or solution of continuity of the bone. The femur, the knee, and the ankle were normal, but upon the tibiæ were numerous nodes, and the shafts of these bones were thickened.

Under the influence of chloroform an incision was made into the last diseased phalanges, and the granular deposit was scraped out. This texture was slightly vascular, soft, yellow, and dry. Pus was not found in it, but was present in the sinuses. This same material was found under the integument of the index-finger. The incision rapidly healed. In the middle finger the shortening increased, and, owing to a retention of pus, an opening was made, and the interior of the metacarpo-phalangeal joint could be seen, where the synovial membrane and cartilages were found to be healthy. The swelling of the toe retrograded without local treatment. The patient came under Dr. Volkmann's care in January, 1869, and had taken iodide of potassium from that time until the latter part of April, with an astonishing effect upon the osseous lesions. At this time she was seized with very profuse hæmorrhage from the stomach and bowels, which resulted in death.

Other forms that the swelling may take on are seen in Figs. 18 and 19, from a case of Berg's, quoted by Taylor. In these but one phalanx is involved, and the joint is comparatively free. The appearance of tubercular dactylitis may vary little from that of the specific form, still there are differences, which, taken together with the history, enable us to make a diagnosis. Fig. 20 shows the hands of a boy, five years of age, suffering from tubercular disease of the vertebræ and dactylitis. The disease was of one year's standing, and began in the forefinger of the right hand; a few months subsequently the little finger of the same hand became swollen, an abscess formed and opened, and there has been a slight discharge ever since. Lately the thumb of the left hand has become swollen. In all these instances the first phalanx is the one involved, and the disease has begun at the articular end of the bone. The skin is not glazed, and is of normal color.

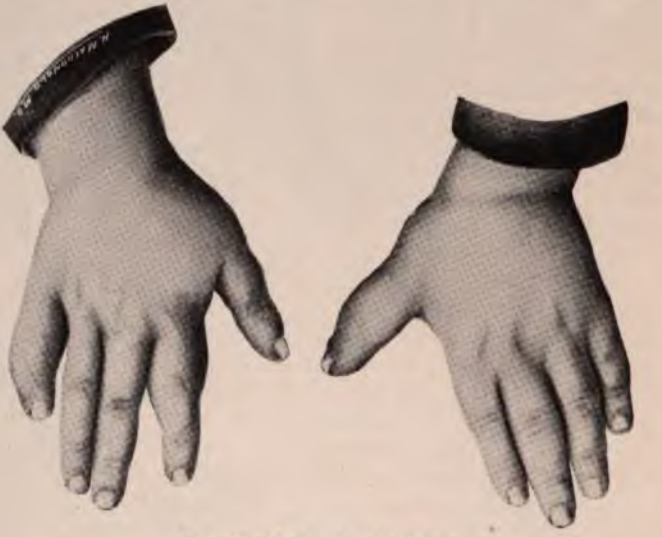


FIG. 20.—Tubercular dactylitis.

Tubercular dactylitis is perhaps a more common disease than might be supposed, and this is perhaps due to the fact that many medical men ascribe all cases of dactylitis seen in early childhood to syphilis, and thus but few cases are on record. During the past year the author has seen four cases, and in three a diagnosis of syphilis had previously been made and the usual treatment for such cases given. In one instance three different surgeons, all of repute, insisted that a case was syphilitic, although the parents denied syphilis and presented no signs whatever of the disease, nor did the child. In this case the ring-finger of the left hand was affected. An abscess formed; it was opened, and the loss of tissue which resulted produced a deformity similar to that in the case of Volkmann's (Fig. 16). The child later on developed a well-marked osteitis of the right knee, which is now being treated. The mother of this child, two years after the dactylitis was discovered, was found to have tuberculosis, and has since died of the disease.

In another case a child of two years of age had well-marked dactylitis, which affected the middle fingers of both hands. The iodide of potassium had been faithfully tried, and she had been taken to several clinics, and in all the diagnosis of syphilis had been made, and yet the only symptom present was the dactylitis. The parents denied syphilis. The child was placed in the hospital and died of broncho-pneumonia a few months later, and at the autopsy no signs of syphilis were found.

As in syphilis affecting the bones, dactylitis syphilitica in early childhood is usually accompanied by some of the other numerous symptoms of syphilis. A careful examination will generally either reveal the presence or absence of the disease in one or both of the parents or in the child. All the symptoms of general syphilis must be considered, and if no active disease exists, a careful search must be made for any traces of the previous lesions.

In later life the same is true, and those whose experience is the largest believe that without a history and careful examination for the presence or absence of other symptoms, no absolute diagnosis can be made between the tubercular and the syphilitic forms of dactylitis.

In adult life some cases of dactylitis occur which never progress to the extent that the finger becomes markedly enlarged or that never go on to suppuration. These are usually seen in patients suffering from an acquired syphilis of many years' standing, in whom the treatment has either been improperly carried out, or in whom treatment has long since been abandoned. As soon as the slight thickening is recognized, either by the patient or the surgeon, active treatment is begun and the disease is practically aborted; and as the syphilitic deposit is entirely absorbed, no trace of the disease may be left.

Diagnosis.—The diseases with which dactylitis may be confounded are paronychia or whitlow, gouty and rheumatic affections, enchondroma, exostoses, and tuberculous lesions.

As in bone syphilis the best comparison is by means of tables, so the same plan will be adopted here, using the table of Deakin, with additions:

Symptoms.	Syphilitic Dactylitis.	Tubercular Dactylitis.	Rheumatic Arthritis.
1. Site.	Phalanges, metacarpal bone of thumb.	Carpus, metacarpus, and phalanges at their articular ends.	Phalanges.
2. Tissue.	Compact tissue (shaft of bone), periosteum connective tissue.	Bone, cancellous tissue, and the synovial membrane.	Synovial tissues.
3. Age.	Adult, as a rule.	Childhood.	Adult life.
4. Condition of skin.	Thickened, red, purple, tense, glistening.	Thickened, may be pale or red, purple, and tense.	Normal.
5. Shape.	Roundish, diffuse swelling.	Uniform enlargement of articular ends.	Uneven enlargement of articular ends.
6. Feel.	Varying from hard to soft.	Varying from hard to soft.	Usually soft.
7. Pain.	Not severe; often worse at night.	Slight; may be absent at first.	Painful.
8. Symmetry.	If tertiary, usually symmetrical, and other joints involved.	Rarely symmetrical.	Other joints usually involved.
9. Tendency.	To suppurate.	To suppurate.	Not to suppurate.
10. Course.	Rather acute.	Chronic.	Rather acute.
11. History.	History of syphilis.	No history of syphilis; there may be a history of tuberculosis.	No history of syphilis; may be a history of rheumatism.
12. Microscopical and bacteriological examination.	Microscopical and bacteriological examination negative.	Microscopical and bacteriological examination may show bacilli of tuberculosis.	Microscopical and bacteriological examination negative.
13. Results of specific medical treatment.	Rapidly improved, if not dispersed.	No result.	May improve.
14. Results of treatment.	Recovery rapid.	Recovery very slow.	Improvement under proper remedies.

Enchondroma.	Exostosis.	Paronychia.	Gout.
Metacarpal bones and phalanges.	Junction of shaft and epiphysis, muscular attachments. Dorsal surface of great toe.	Last phalanges.	Great toe joints and phalanges at their articular ends.
Usually within the substance of the bone which incases the growth.	Often from ossification of the epiphyseal cartilage.	Tissues about the nail and the soft part.	The synovial membrane.
Adolescence.	Adolescence.	In children and adults.	Adult life.
Normal.	Normal.	Red, purple, glazed.	Normal.
Clearly circumscribed, not involving joint.	Clearly defined, broad and flat, or pedunculated.	Diffuse, most marked about the nail.	Defined, and limited to articulation.
Usually firm.	Hard.	Soft, with sense of fluctuation beneath.	Varying from soft to hard.
Painless.	Painless unless a nerve is involved.	Very painful.	Painful.
Often symmetrical.	Often symmetrical.	Never symmetrical.	Often symmetrical, and more than one joint involved.
To ossify.	To eburnate.	To suppurate.	Not to suppurate.
Usually chronic.	Chronic.	Rather acute.	Rather acute.
No specific history.	No specific history.	No specific history.	No specific history, but history of gout.
Microscopical examination may show the character of the growth.	Microscopical examination may show the character of the growth.	Microscopical examination will show pus.	Microscopical examination may show chalky deposits.
No result.	No result, but exostosis of clavicle in childhood may disappear spontaneously.	No result.	No result.
Slow to improve.	Slow to improve; usually not affected by treatment.	Incision and evacuation usually only cure.	Improvement under proper remedies.

Prognosis.—The prognosis in dactylitis is good, although losses of substance may occur which impair the appearance and usefulness of the finger. Where only one phalanx is affected and the joint not involved, recovery may leave the finger in normal condition, or there may result slight thickening which is of no consequence. If the articulation is involved, anchylosis may result, or, if destruction occur, a flail joint; the latter condition is perhaps more serious than the former, and will require the use of some form of support to enable the finger to be used to advantage. If suppuration occur, the soft parts may be destroyed and disagreeable cicatrices result and thus new deformities be produced, and this may complicate the prognosis. Another element to be considered in prognosis is the amount of other tissues involved, as this is generally only one indication of the disease, and may be the least serious.

Treatment.—The treatment should be constitutional and local. The constitutional treatment should be that used for a case of syphilis—the iodides, either singly or in combination with mercury. Tonics and proper remedies for the general health should not be neglected.

The *local treatment* is the same as for gummata in other bones; incision should not be resorted to. The swelling will resolve and disappear under appropriate treatment. If suppuration has occurred, the part should be freely opened, drained thoroughly, and treated on general surgical principles. The incision should be made in the long axis of the finger, so as to avoid cutting the tendons, and the finger kept in such position that, if anchylosis should unfortunately occur, the finger will be extended. A permanently flexed finger is of less use and more in the way than one anchylosed in a straight position or nearly so. If necrosis of bone has occurred, by means of the Volkmann spoon or curette all diseased tissues should be thoroughly removed, and healing promoted in the usual manner. These fingers should not be amputated except in very rare instances, and in such cases the necessity will arise from subsequent pus infection, and not from the syphilitic dactylitis.

SYPHILIS OF THE UPPER AIR-PASSAGES.

THE NOSE, PHARYNX, LARYNX, TRACHEA, AND BRONCHI.

BY JOHN NOLAND MACKENZIE, M. D.

HISTORICAL.

IT is not the purpose of the present article to discuss the antiquity of the venereal complaint, but simply to briefly review the evidence of its ancient origin so far as it relates to affections of the nose and throat. As some of the weightiest arguments in favor of the remote existence of syphilis rest upon the supposed early recognition of specific disease of the upper respiratory apparatus, it may be interesting to examine the reasons alleged for this assumption, which has been defended with so much talent and erudition.

It has been maintained by some that certain passages in the ancient records of Chinese and Hindu medicine render it probable that syphilitic affections of the nose and throat have been recognized from the earliest times. (For a full statement of this argument, see Lancereaux's Treatise on Syphilis, New Syd. Soc. Trans., 1868, vol. i, pp. 8-10; quotations taken from Captain Dabry's book, La Médecine chez les Chinois, Paris, 1863; and from Hessler's translation of the Ayur Véda.)

The evidence deducible from the researches of Dabry is, however, as Verneuil (see Lancereaux) has pointed out, inconclusive in view of their many chronological inaccuracies, while there is no sufficient reason for the belief that the disease described in the Ayur Véda is the affection which we now recognize as syphilis.

Both Hippocrates (Epid. 6, sec. 1) and Galen (Isag., cap. 20) allude to falling in and depression of the nose from recession of the palate-bones, and they and their followers refer to destructive ulceration of the larynx, trachea, and nose. Aretæus (De causis acut. morborum, lib. i, cap. 8), in his famous and much-discussed description of the disease called *uva*, asserts that the palate-bone is sometimes laid bare, and that the ulcerative process spreads over to the fauces, and even the epiglottis; but these isolated observations furnish obviously slender data upon which to base the antiquity of the venereal complaint.

The attention paid to and the frequency with which the disease called by the Greeks *ozæna* is encountered in the writings of the ancients, are at first sight naturally suggestive of their acquaintance with syphilitic affections of the nasal passages; but if we reflect upon the sense in which this term was employed by the large majority of physicians and grammarians of those times, we shall be obliged to confess that it forms an uncertain element in the chain of evidence which links the nasal syphilis of to-day with the ozæna of the Greek physicians.

By many of the ancient medical writers ozæna and polypus are used as convertible terms, and the cure of the two affections is considered under the same head.

In this sense, too (i. e., as synonymous with polypus), the term is used by Pliny; and even among the later Latin grammarians the appellation *ozænosus* was applied to those who suffered from nasal polypi. It is exceedingly probable, then, that the term ozæna did not carry with it the same significance which attaches to its use at the present day. The ancients have left but scanty record of the measures they adopted in cleansing the nasal passages; and, indeed, if we consider their notions concerning the pathology of nasal discharges, it would not be surprising if they neglected that important process altogether. A form of instrument, the *rhinenchytes*, for injecting the nasal cavities, is mentioned by Aurelian (De chron. morb., lib. ii, cap. 4; lib. iii, cap. 2) and Scribonius Largus (De compositionibus medicamentorum, comp. vii), but it is highly probable that the important hygienic measure of systematic cleansing and disinfection was neglected, and that the secretion was allowed to accumulate and decompose within the nostrils—a condition which we know favors the development of a peculiar odor even in simple catarrhal inflammation of these cavities. It is, moreover, very probable that the hypertrophic, and consequently the atrophic, form of rhinitis were common affections among the citizens of ancient Greece and Rome. Finally, as the term ozæna, especially when used in the sense of a stench from the nostrils, serves to express a number of different pathological states, and in the light of our present knowledge concerning atrophic rhinitis, it is illogical to maintain that the ancients were acquainted with the nasal form of syphilis because of the frequent allusion to ozæna in their medical writings.

The foul mouth, hoarse voice, and snoring respiration of the cunnilingus, fellator, and irrumator (see especially Martial, i, 66, 79; vi, 41; iv, 41; xi, 30; vi, 55; xi, 92, 61; vii, 33, etc.), have been thought to indicate syphilitic affections of the throat; but, as I have suggested elsewhere, they were doubtless the symptoms of a catarrhal process acquired in the discharge of their filthy occupations.

Reiskes thus describes the cinædus or sodomite: "In naribus et in palato vitium, a qua clare non potuerint eloqui, sed, ῤεγχειν stertere et rhoncissare debuerint" (Observ. miscellan., Leid., 1745, def. p. 28). The value of this passage in evidence, it seems to me, turns upon the rendering of the word *vitium*, and not, as Rosenbaum (Die Geschichte der Lustseuche im Alterthume, Halle, 1845) and others maintain, upon the verb ῥεγχειν, which may mean anything from a simple inflammatory condition to destruction by ulceration; and it may with equal justice be contended that the affection described by Reiskes may be referred to the advanced forms of hypertrophic naso-pharyngeal catarrh. At all events, there is no possible reason why we should lay the affection of the sodomite at the doors of syphilis.

Equally uncertain is the evidence adduced by the same writer (Orationes ex recensione, Lipsiæ, 1784, vol. ii, orat. 33; see also Rosenbaum, *op. cit.*, p. 158) from the disease of the armpits among the Lesbians, which destroyed their noses and voices, and was supposed by Dio Crysostom, who drew attention to it, to have been the angry visitation of the goddess Aphrodite.

If now we turn to the passages which have been taken from the satirical writers of antiquity, the same uncertainty is found. The following are the only ones, it seems to me, worthy of the slightest consideration. The first is taken from Martial. A certain Festus, after he found that a dire disease had invaded his fauces and crept into his countenance, committed suicide.

> "Indignas premeret cum tabida fauces
> Inque ipsos vultus saperet atra lues" (lib. i, 78).

The second is also from Martial, and refers to the debauchee and sodomite:

> "Qui recitat lana fauces et colla revinctus
> Hic se posse loqui, posse tacere negat" (lib. iv, 41).

Now, it is perfectly obvious that the disease from which Festus was supposed to suffer may have been a cancerous or other malignant affection; and in the case of the debauchee it is manifestly absurd to infer the existence of syphilis from what was most probably a simple sore throat.

In the fifteenth century there lived an obscure poet, by name Pacificus Maximus, who, in spite of his apparently dissolute tendencies, as reflected in a volume of wanton poems published by him in 1489, managed to eke out a lascivious existence of exactly one hundred years.* Among his poems is the following invocation of Priapus, which possesses a certain historical value:

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* Born 1400, died 1500.

"Tuque meum si non properas sanare Priapum,
Decidet heu! non hoc nobile robur erit.
Ante meis oculis orbatus priver, et ante
Abscissus fœdo nasus ab ore cadat!
Non me respiciet, nec me vollet ulla puella,
In me etiam mittet tristia spata puer,
Laetior heu! toto me non erat alter in orbe!
Si cadet hic, non me tristior alter erit.
Me miserum! Sordes quas marcidus ore remittet!
Ulcera quæ fœdo marcidus ore gerit!
Aspice me miserum, precor, O! per poma, per hortos,
Per caput hoc sacrum, per rigidamque trabem,
Hinc ego commendo tota tibi menta, Priape,
Fac valeat, sic sit sanus ut ante fuit." *

In connection with the early origin of the venereal complaint I would like to call attention to the following passages, which I discovered accidentally while engaged in a historical research foreign to the subject now under review. The sonnet is one by Sulpicius Lupercus Servastus, Junior,† and runs as follows:

"Atqui sunt, quod propter honestum rumpere fœdus,
Audeat inlicite pallida avaritia.
Romani sermonis egens, ridendaque verba
Frangit ad horrificos turbida lingua sonos.
Sed tamen ex vultu adpetitur spes grata nepotum.
Saltem istud nostri forsan honoris habent.
Ambusti torris species, exesaque seclo
Abduntur priscis corpora de tumulis
Perplexi crines, frons improba, tempora pressa,
Extantes mala deficiente genæ
Simatque jacent pando sinuamine nares.
Territat os nudum, cæsaque labra trement.
Defossum in ventrem propulso pondere tergum
Frangitur, et vacuo crure tument genua.
Discolor in manibus species, ac turpius illud,
Quod cutis obscure pallet in invidiam."

(Sulpicius Lupercus Servastus, Junior, in Anthologia veterum latinorum epigrammatorum et poetarum, Lib. i, p. 515 *et seq.*, ed. Burmann, Amstelodami, 1759.)

Leaving now the question of the ancient recognition of the throat and nasal lesions of syphilis, and coming down to the close of the fifteenth century, when the affection is generally supposed to have been discovered, we find that the earlier writers on the lues venerea looked upon softening of the uvula, ulceration of the pharynx, tonsils, and fauces, perforation of the palate, catarrhal and destructive disease of the nasal passages, and a hoarse and raucous character of the voice, as diagnostic signs of the disease (see Nic. Leonicini, De epidemia, etc., in Aphrodisiac, sive de lue venerea, ab Aloysio Luisino, Lugd. Bat., 1728; Nic. Massa, De morbo gallico, cap. 7, et quarti tract., cap. 4, Aphr., pp. 46, 96, and 97; Jacob. Cataneus, De morb. gall., cap. 4, Aphr., p. 148; Pet. Maynardi, De morbo gall. tract., i, c. 4; Fernelius, De lue venerea caput, Aphr., pp. 613, 614; Victorius, De morb. gall., liber, cap. 3, alludes to flattening of nose and caries of nasal bones, ozæna, polypus, hypertrophic catarrh, etc.; Marchelli, De morb. gall. tract., Aphr., p. 732; Fallopius, De morb. gall. tract., cap. 23, Aphr., p. 781, and cap. 93, p. 824; Botallus, Luis venereæ curandæ ratio, cap. 4; Tomitanus, B., De morb. gall., lib. i, cap. 28, p. 1047, also lib. ii, cap. 1, p. 1053; Sylvius, De morb. gall. tract., p. 1109; Paschal, De morb. gall. tract., p. 1113; Borgarutius, De morb. gall. methodus, cap. 7, p. 1129 *et al.*; see also Benevenius, Antonius, De morb. gall. tractatus, in his work De abditis nonnullis ac mirandis morborum et sanationum causis, Florent., 1507; this work is the first essay on pathological anatomy, Library Surgeon-General's Office, Washington). Among them, Frascatorius (Hieronymi Frascatorii, Veronensis, Syphilis, sive morbi gallici, lib. iii, lib. i, Aphr., p. 187, B. and lib. ii, Aphr., pp. 191, 192, C., A. D. 1555; see also Frascator, De Syphilide, seu morb. gall. lucubratio, cap. 1, Aphr., p. 199), in his celebrated poem on syphilis, speaks of affections of the voice and obstruction in the pharynx; and Alexander Trajanus Petronius (De morbo gallico, lib. ii, cap. 22, Aphr., pp. 1222, 1223, and lib. vii, cap. 8 and cap. 19) (1566) refers to liquids taken by the mouth returning thereby, and to chronic hoarseness (*vox rauca perseverans*) as symptoms of syphilitic infection. Both Maynardi (*loc. cit.*) and Fallopius mention difficult breathing from disease of the larynx and trachea, and tinnitus and other symptoms referable to disease of the ear were observed, among others, by Botallus, Tomitanus, and Petronius.

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* Attention was first called to this poem by Sanchez, in the Journal de Vandermonde, for October, 1759 tom. ix.

† Nothing is known concerning the age at which this member of the Sulpicii lived, the only trace of his literary existence being preserved in the above.

While these writers were doubtless thoroughly conversant with the ravages produced by syphilis in the nose and pharynx, and with affections of the voice and respiration, nothing definite was known concerning the pathological changes in the larynx until about the middle of the seventeenth century, when Marcus Aurelius Severinus (this case is recorded in the Collegium Anatomicum of Severinus, from which it is taken by Bonetus, Sepulchretum, Ludg., 1700, tom. i, p. 766) found in the body of a girl, dead of syphilis, the epiglottis completely destroyed by ulceration. This writer (see Astruc, De lue venerea, tom. ii, p. 921; Van Swieten, Comm. in Aphor.; Boerhaave, § 1445; and Lieutaud, Hist. Med., tom.

ii, lib. iv, obs. 105, Parisiis, 1777; also Lieutaud, Synopsis of Pract. of Med., ed. Atlee, Philadelphia, 1816, p. 97) seems also to have been familiar with ulceration of the trachea, bronchi, and œsophagus.* In 1678 Gunther Christopher Schelhammer (Diss. inaug. de voce, ejusque affectibus, cap. 2, p. 52, Jenæ, 1678) adverted to dryness of the larynx from ulceration of the uvula; and in the early part of the following century Vercollonius (De pudendorum morbis, sec. 2, 12, p. 182; 9, 10, 13, p. 183, and 14, p. 184, Lugd. Bat., 1722) gave a systematic account of syphilitic affections of the tonsils, pharynx, larynx, trachea, and œsophagus. Later on the subject of throat syphilis, from a clinical standpoint, was treated of in detail by Boerhaave (Aphorism. de cognos. et curand. morbis, § 1445, Lugd. Bat., 1728; also Tract. de lue venerea, Lugd. Bat., 1751), Astruc (De morb. ven. libri sex, etc., ii, cap. 2, cap. 7, iv, cap. 4, and cap. 8 and 11, § xii, Parisiis, 1736, 1738, and 1755; see also Lond. ed. of 1754, pp. 124 to 159 of Bk. ii, and pp. 9–14, 15, 89, 90 of Bk. iv), Plenck (Joseph Jacob Plenck, Doctrina de morbis venereis, pp. 93, 94, 97, 99, 100, 143, 147, and 149–151, Viennæ, 1779; this writer seems to have been personally familiar with syphilitic affections of the œsophagus and cicatricial stricture of the pharynx), Benjamin Bell (A Treatise on Gonorrhœa Virulenta and Lues Venerea, vol. ii, pp. 37 and 43, Dublin, 1793), John Hunter (Treatise on the Ven. Dis., pt. vi, chap. ii, p. 262 *et seq.*, in works, with notes by Babington, Phila., 1839; see also Babington's excellent observations, pp. 266, 268), and Swediaur (Complete Treatise on the Symptoms, Effects, etc., of Syphilis, Phila. ed., 1815, p. 293; Swediaur also alludes to affections of the ear [tinnitus] from compression and corrosion of the Eustachian tubes, p. 294), while Morgagni (De sedibus et causis morborum, epist. xliv, cap. 15, Lond. ed., 1769) directed attention to the anatomical appearances of the affection. Among the writers of the eighteenth century Raulin (Traité de la phthisie pulmonaire, par M. Raulin, pp. 13 and 79, Paris, 1784) seems to have been acquainted with syphilitic ulceration as it affects the larynx, trachea, and œsophagus.†

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* Severinus's observations were made in the post-mortem room of a large hospital for venereal complaints, and must be regarded as the first pathological researches in the direction of syphilitic affections of the larynx.

† In the sixteenth century, Schenck, of Grafenberg (Observat. medicæ de capitate humano; hoc est exempla capitis morborum, etc., obs. cccxlix, p. 397, Basiliæ, 1584), spoke of the "gula ex ulcere gallico exesa procidens devorata," and also of perforation and loss of the palate (obs. cccxlvii, from Paré). In 1778, Andrew Duncan (Medical Cases, etc., p. 176 *et seq.*, Edinburgh, 1778) called attention to dysphagia resulting from increased sensibility of the pharynx from pre-existing syphilitic sore throat; and Zeviani (quoted by Voigtel, Handbuch d. path. Anat., Bd. ii, Halle, 1804) placed on record a case in which a syphilitic ulcer of the windpipe communicated with the œsophagus. I would also call attention to the fact that Dolæus (Encyclopædia chirurgica rationalis, etc., ii, cap. v, p.

At the beginning of the present century, Thomann (J. N. Thomann's Annalen der klinischen Anstalt in dem Julius Hospitale zu Würzburg f. das Jahr 1800, p. 242, Würzburg, 1803; see also case in Hufeland's Bibliothek der prakt. Heilkunde, Bd. ii, St. ii, S. 143) drew attention to syphilis of the windpipe; and Altenhofer (Beobachtungen über die Natur u. Heilung der Syphilis; Russische Sammlung f. Naturwissenschaft u. Heilkunst, Bd. i, St. ii, 2ter Abschnitt, S. 36, Riga u. Leipzig, 1816) announced, in a very valuable paper based on extensive experience, that tracheal phthisis is often the result of malignant or neglected syphilitic throat ulceration.

The impulse given to the pursuit of pathological anatomy by the colossal labors of Morgagni led, among other things, to the study of ulceration of the upper air-passages, and to the publication of a number of special treatises on the subject.*

I. SYPHILIS OF THE NASAL PASSAGES.

The great vascularity of the lining surfaces of the nasal passages, their spongy and cavernous structure, their constant exposure to the exciting causes of hyperæmia and inflammation, together with a certain amount of vulnerability begotten of their natural delicacy of structure, combine to make the nose an attractive site for the localization of syphilitic lesions. Indeed, the annals of syphilis in years gone by contain no more graphic illustrations of its power for tissue destruction than those afforded by the nasal apparatus.

276, Francofurti ad Mœnum, 1703), in his chapter on strictures of the œsophagus, observes, "Aliquando angustia hæc fieri solet a caruncula gulæ ex ulcere venereo aborta." These cases of œsophageal syphilis may be added to those collected from the older literature of the subject by Astruc, Van Swieten, and Lieutaud.

* The principal of these are the following: Before the era of pathological anatomy, Richard Morton, Phthisiologia, seu exercitationes de phthisi, Londoni, 1689; after the time of Morgagni, Petit (M. A.), Diss. de phthisi laryngeā, Monspelii, 1790, October 25th; copies of both these rare tracts may be found in the library of the Surgeon-General's office; Sauvée, Recherches sur la phthisie-laryngée, Paris, 1802; Schönbach, De phthisi laryngeā, Wilmæ, 1808; Jos. Sigaud, Recherches sur la phthisie laryngée, Strasburg, 1819; Wilhelm Sachse, Beiträge zur genaueren Kenntniss u. Unterscheidung der Kehlkopfs-u. Luftröhren-Schwindsucht, Hanover, 1821; Barth, Mem. sur les ulcerations des voies aëriennes, Arch. gén. de Méd., 1839, p. 137, et folg., which culminated in the classical mémoire of Trousseau and Belloc (A Practical Treatise on Laryngeal Phthisis, Chronic Laryngitis, and Diseases of the Voice, translated from the French, Phila., 1839). These observers, as well as those who preceded them, included syphilis, tuberculosis, and other chronic laryngeal affections under the generic term "phthisis laryngea," and this confusion practically reigned until the introduction of the laryngoscope, and the pathway to differential diagnosis was opened by the laryngoscopic studies of Tuerck (Allg. Wiener med. Zeitung, No. 48, 1861; No. 43, 1866; also Klinik der Krankheiten des Kehlkopfes, etc., Wien, 1866).

ACQUIRED NASAL SYPHILIS.

Primary Lesion.—The initial sore of syphilis is very rarely found in the nasal passages. In the few recorded cases of this accident the poison appears to have been conveyed by means of unclean instruments (Eustachian catheter), or by the introduction of the finger into the nose. The cartilaginous septum, the inner surface of the alæ, and the junction of the mucous membrane and skin, are the situations in which the chancre has been found.

As far as can be judged from the meager literature on the subject, the appearance of the ulcer does not present all the well-known characteristics of a typical chancre. The immediate diagnosis—that is to say, before the appearance of any skin lesion—must therefore rest upon the presence of unusual hardness in the sore and the negative result of microscopic examination of the secretion taken from it. The latter test, which the scientific precision of to-day demands in all doubtful cases, excludes tuberculosis, and therefore lupus, and narrows the differential diagnosis down to the separation of the ulcer from malignant neoplasm. In this situation both chancre and primary cancer are rarely met with, and, if doubt should arise, the subsequent behavior of the lesion will soon settle the matter.

Rhinitis.—Acute and chronic rhinitis are common in syphilitics. There is nothing by which the rhinitis of syphilis may be differentiated pathologically from catarrhal rhinitis, except perhaps the deposit of connective tissue in excess in the hypertrophic stage, the often swift passage of this stage into the cirrhotic or atrophic, and the preponderance in some cases of pus-cells in the discharge. Rhinitis may appear at any period of the disease.

Secondary Lesions, Erythema, Mucous Patches.—Erythema, according to most authorities, is rarely met with, but as it gives rise to little discomfort, and is evanescent in character, it is doubtless often overlooked. Mucous patches, on the other hand, are seldom encountered within the nasal fossæ. Opinions differ as to the frequency with which they are found at the junction of the mucous membrane and the skin. The mucous patch is a fugitive lesion, and gives rise to comparatively little discomfort when situated at the vestibule of the nose. Hence comparatively few cases consult the rhinologist, who is therefore not in the position to judge of the matter that the syphilographer occupies who watches his patient throughout the whole course of the disease.

Lesions of the Tertiary Period.—In the secondary period the structure chiefly involved is the mucous membrane. Occasionally ulceration following the disintegration of a mucous patch or condyloma, and extending below the superficial layers, is met with, but this is exceptional. In the tertiary period, on the other hand, all of the nasal structures may be involved, either singly or in combination.

The lesions of this period are gummata, diffuse infiltration, deep ulceration, and fibroid degeneration.

Gummata and Diffuse Infiltration.—At the present day circumscribed and diffuse gummatous deposit in the nasal passages is not seen as frequently as in former times. Indeed, the same may be affirmed of all tertiary lesions.

Although found in every portion of the nasal cavities, gummatous infiltration is most commonly met with on the septum and floor of the nostrils. The posterior nares and turbinated bodies are also favorite seats of the gummous deposit. The primary seat of the infiltration may be in the mucous membrane, bone, and periosteum, or in the cartilage.

Deep, destructive ulceration generally follows the disintegration of gummatous infiltration, and is therefore chiefly found in the situations spoken of above as favorite seats of this degenerative lesion of syphilis.*

Fibroid Degeneration.—In the International Journal of Laryngology and Rhinology for April, 1889, I first called attention to this form of syphilis of the nose. As far as I am aware, the condition had never before been described, either by rhinologists or writers on venereal disease. Fibroid degeneration of the larynx (*vide infra*) had been recognized, but had not attracted, as it does not now attract, the study it deserves. It occurs not only in the constitutional syphilis of the adult, but also in the congenital form of the disease (*vide infra*). As almost all writers on laryngeal syphilis overlook the fibroid changes in the larynx, and as the presence of interstitial fibroid degeneration of the nasal passages and pharynx seems to be practically unknown, I will give a brief description of its chief characteristics, for the condition is not only of pathological but also of great clinical importance.

Like the fibroid changes in the larynx, it is met with mainly in those long-neglected cases, with their story of a life of reckless dissipation, which turn up at the hospital and dispensary. I have seen it more commonly in men, and especially in those addicted to the constant use of large quantities of alcoholic beverages. While it occasionally affects the septum and other parts of the nasal cavities, the turbinated bodies are the structures which chiefly suffer, and in which its pathological nature may be most conveniently and satisfactorily studied. These bodies are very much enlarged, and present the appearance of dense, hard, whitish-yellow or red sessile masses, or are converted into distinctly pedunculated growths, which not only resemble but are in actual fact true fibroid polypi of this region. Indeed, I am inclined to believe that a large proportion of the so-called fibroid tumors of the nasal fossæ found in syphilitic subjects are none other than the prolongations of the degenerate turbinated bodies. These fibroid masses obstruct the passage of air, and often alter in a marked degree the anatomical relations of the parts. They are sometimes attacked by ulceration, and in this way partially destroyed; or they may be bound, as the result of the ulcerative process, to opposing structures by dense band of cicatricial tissue.

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* The appearance and pathological history of the gummy tumor and syphilitic ulcer will be found in the section on Syphilis of the Larynx.

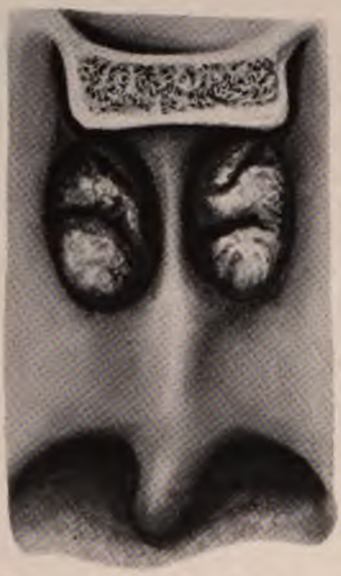

Fig. 1.—Syphilitic fibroid degeneration of the middle and inferior turbinated bodies. Rhinoscopic image.

Portions removed with the snare present under the microscope a more or less complete conversion of the turbinated body into a dense fibrous tissue. The erectile cells and glands are either totally obliterated or inconspicuous, while the encroachment of the fibrous process on the epithelial layers impedes its nutrition and causes degeneration and detachment of its cells.

In this way it happens that the greater part of the mass is destitute of epithelium. As far as my isolated and limited experience goes, it would seem that the tendency in this variety of nasal syphilis is toward the production of fibrous outgrowth in excess rather than in the direction of final atrophy; and this point may serve to differentiate it pathologically from the ordinary hypertrophic rhinitis of syphilis.

The pharynx is probably less frequently than the nasal passages the seat of fibroid degeneration. The parts most commonly affected are the tonsils and faucial pillars, which are sometimes converted into a dense mass in which all trace of their original anatomical appearance is lost. In one of my cases the uvula was enormously enlarged, elongated, indistinctly lobulated, of the hardest consistence, and interfered markedly with the muscular movements of the palate.

Symptoms, Complications, and Sequelæ.—These are obviously manifold, and vary from slight discomfort to total abolition of nasal functions and complete destruction of the nasal framework. Their full consideration in detail is therefore not possible in the contracted limits of the present review. Familiar sequelæ are perforation of the cartilaginous and bony septum and of the palatine roof, caries and necrosis of bone, "ozæna," and extension of the disease to the antrum and other accessory cavities, and to the bones of the face and skull. Cases have been reported in which the brain and meninges have been involved, and death from meningitis has resulted. Death has also resulted from the detachment of large portions of the bony structures of the nostrils. The remarkable case of Baratoux, in which the greater portion of the sphenoid bone was detached and expelled without brain symptoms, is most exceptional in character. A distressing case, in which death resulted from neglected nasal syphilis, occurred under my own observation some years ago.

A young married woman of high social standing had for a long time trouble with her nose, but, ignorant of its true cause, and not wishing to disclose her misfortune to others, neglected treatment until the bridge of the nose sank in and the odor of carious bone compelled her to seek medical aid. I found almost the entire cartilaginous and part of the bony septum gone, the perpendicular plate of the ethmoid loose and hanging free in the central line. I removed with care the entire plate, and also large portions of the turbinated bones. Under constitutional treatment the patient was restored—with great deformity of the nose, of course—to perfect health. She remained so for three years, when she was taken ill again, and the family undertook to treat the case at home. When I saw her weeks afterward, the disease had destroyed the entire turbinated structures, the antra were widely open, necrotic, and filled with foul pus, and convulsions and other brain symptoms had set in. In spite of vigorous treatment she died in a few days of meningitis.

Other familiar sequelæ of nasal syphilis are the deformities, both external and internal, to which it gives rise. Opposing intranasal structures may be bound together by adhesions (synechiæ), the anterior and posterior nares may be obliterated by cicatricial tissue, or the entire fossæ (in rare cases) be rendered completely impervious throughout their entire length. In other cases the anatomical relations are so disturbed that the true structure of the nasal fossæ is placed beyond recognition.

The deformities of the external nose are quite characteristic. As the result of ulceration and disintegration of tissue the bridge and fleshy portion of the nose sink in and form several notable shapes. Thus, the nose may be simply flattened

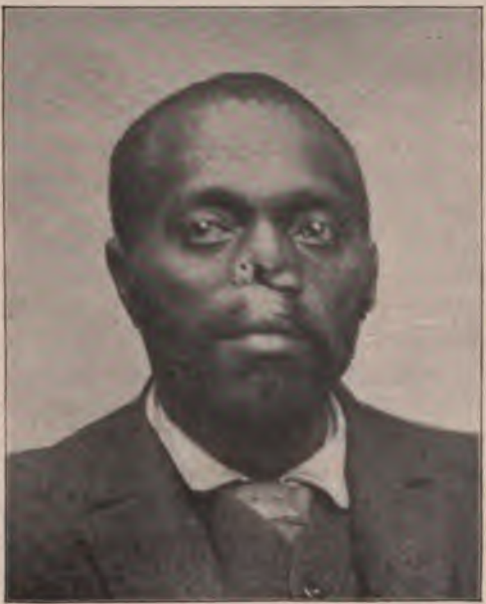

FIG. 2.—Destruction of nose and upper lip by tertiary syphilis. (Photographed by Dr. R. T. Taylor.)

across the bridge (producing several varieties from simple depression to the well-known "saddle-shape"), or, when the intranasal destruction is extensive, the alæ may collapse toward the middle line, forming with the depressed and pendulous tip of the nose a typical deformity which we may denominate the trefoil or clover-leaf deformity.

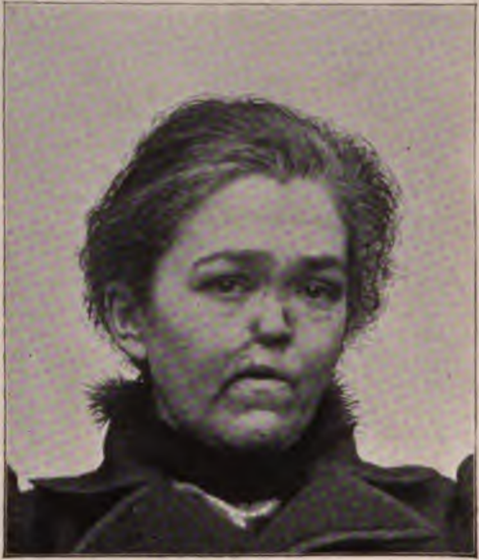

FIG. 3.—Acquired syphilis; showing effect of tertiary disease of the nose. (Photographed by Dr. R. T. Taylor.)

Occasionally perforation of the sides of the external nose occurs, or the whole organ may be completely destroyed.

A very rare result of nose syphilis is general septic infection, with the formation of metastatic abscesses in other portions of the body.

Diagnosis.—The diagnosis of the various forms of syphilis of the nose is, as a rule, sufficiently easy. It may be well, however, to call attention briefly to a few by no means impossible sources of error.

In the first place, it should be constantly kept in mind that, while perforation of the nasal septum—and this is especially true of the bony septum—is in the vast majority of instances due to syphilis, it may be due to other causes and present appearances identical with those seen in syphilitic destruction of the cartilage and bone. Thus it may be (1) congenital; (2) the result of traumatism, as in picking the nose, the incautious use of instruments and chemical applications; (3) intentional perforation (operation of Blandin for deflection of the septum, consisting of punching a hole in the cartilaginous portion with an instrument resembling a conductor's punch); (4) the result of ulceration left by certain acute blood diseases, such as typhus, typhoid, and scarlet fever, smallpox, diphtheria, etc.; (5) the result of hæmatoma or abscess of the septum; (6) the ulceration of tuberculosis or its close blood-relation lupus; and, finally, (7) it is a common and characteristic accident in factories where chrome * and allied substances are manufactured. In the chrome factory of Baltimore, the workmen employed in the chambers where the bichromate is made almost invariably acquire perforation of the cartilaginous septum from the irritating and corrosive action of the fumes and floating dust evolved during the chemistry of its manufacture. There is generally absence of ozæna or fetor; simple medication effects a cure if removal from the exciting cause is possible; the process is self-limited, and when the ulceration is no longer active there is no deformity of the external nose. By these characteristics it may be distinguished from the perforation of syphilis.

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* See article by the author in the Journal of the American Medical Association, November 29, 1884; also one in the Annales des maladies de l'Oreilles, du Larynx, etc., 1884.

In the second place, care should be taken not to confound fibroid degeneration with gummata, for the treatment for the two lesions is entirely different. In the one, surgical aid is indicated; in the other, surgery would be most disastrous. The fibroid masses are to be distinguished by their often pendulous or polypoid character, by their irregular outline, by their pale color, and by the anæmic condition of the surrounding mucous membrane. Gummata, on the contrary, are soft, elastic, present a peculiar yellowish, submucous discoloration, and are generally surrounded by a congested mucous membrane.

In the third place, synechiæ and scar tissue found in the nasal passages by no means always point to syphilis, although they may well excite the gravest suspicion. The former may be congenital, and both may be due to other ulcerative diseases, or to various traumatic or chemical causes.*

The differential diagnosis between syphilitic, tubercular, and cancerous ulceration will be found in the section on Laryngeal Syphilis. It is only fair to state, however, that in the nasal passages the differences between the three are not always as clearly defined as they are in the pharynx and larynx. Finally, the odor which occurs in the disintegration of bone caries and necrosis in syphilis should not be confounded with the peculiar stench which accompanies cirrhosis of the nasal membrane. This latter has been compared by the French to the smell of crushed bedbugs, but even this is not sufficiently descriptive. It is penetrating, sickening, diagnostic in itself—an odor *sui generis*. Each odor is separate and distinct, and the combination of the two baffles all the powers of description.

Prognosis.—In mild forms of syphilis of the nose the prognosis is uniformly good. Even in tertiary lesions, under modern methods of treatment, it is excellent. In the presence of extensive destruction of the hard structures it is much worse, though a great deal can be done to arrest the disease, if the condition of the patient and his environment are otherwise good. Finally, in some cases there appears to be an innate malignancy, rebellious to all treatment, which only stops at death.

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* I have seen, as the result of frost-bite, deformities of the external nose which resembled in every particular the condition left by syphilis.

Treatment.—The management of nasal syphilis is (1) constitutional and (2) local. The constitutional treatment of syphilis is fully given in other portions of this work. Rhinitis calls for the ordinary measures employed in the treatment of catarrhal inflammation. Mucous patches and condylomata are best treated with nitrate of silver, in solid stick, or in strong solution (ʒ j ad ℥ j). Tertiary ulcers heal well under iodoform and allied substances. Caries and necrosis should be managed on ordinary surgical principles. Dead bone should be removed with caution, especially when not detached with ease. I have personal knowledge of cases in which the surgeon brought on serious symptoms by the too vigorous removal of sequestra. Indeed, sequestra, even when loose, may possibly be detached with fatal results, and the surgeon may receive the odium from which Nature would have protected him a few days later.

In desperate cases, the interior of the bony nose may be exposed by dissecting up the lip and soft parts of the nose (as in the Rouge and similar operations) and carrying them over the forehead. Fibroid growths may be removed instrumentally (snare, electric cautery), or by means of chemical action (acids, etc.). In the removal of gummata the internal administration of iodide of potassium may be combined with the topical application of iodine, or a weak solution of the iodide of zinc.

CONGENITAL SYPHILIS OF THE NASAL PASSAGES.

The nasal passages of the congenital syphilitic may be the seat of all the lesions described above under the head of acquired disease. In babyhood the superficial lesions, notably purulent catarrh or rhinitis, is most commonly met with, while the deeper destructive lesions are found later on in life, and notably in the so-called "latent" form of the disease. This rule is, however, by no means absolute, for widespread destruction of the intranasal framework has been found not many months after birth.

Syphilitic coryza, or the "snuffles" as it is popularly called, was supposed by Diday to be due to the presence of mucous patches within the nose; but this is probably an incorrect supposition, for most authorities deny the frequency of mucous patches on the nasal mucous membrane. The rhinitis of congenital syphilis is usually a purulent rhinitis, becomes quickly offensive, and leads often swiftly to hypertrophy and subsequent atrophy with the development of ozæna. The discharge is especially acrid, and excoriates and fissures the upper lip and nasal vestibule. The turbinated bodies become quickly permanently swollen; mouth-breathing results, with interference with the act of suckling, and therefore with the maintenance of life. If the case be neglected, the secretion later on becomes bloody and more purulent, and the nutritive processes correspondingly arrested. Rhinitis may be intrauterine in origin, or it may not supervene until a few weeks after birth.

As stated above, the deeper destructive lesions are usually seen later in life, and especially at some physiological epoch, as puberty. At this latter period the destruction of the nasal tissues is often widespread.

Treatment should be carried on in obedience to the same rules that regulate the management of the acquired disease. The system should be rapidly put under the influence of mercury. The nasal passages should be scrupulously cleansed by means of disinfectant solutions, followed by antiseptic applications, among which the bichloride of mercury ranks especially high. After syringing the nostrils with warm milk, the detergent and disinfectant may be applied. This cleansing process should be done two or three times a day, or oftener, according to circumstances. In the evening, an ointment may be applied as a substitute for the liquid applications—such as, for example, one containing the yellow oxide of mercury in the proportion of six to ten grains to the ounce of vehicle, and allowed to remain in the nose during the night.

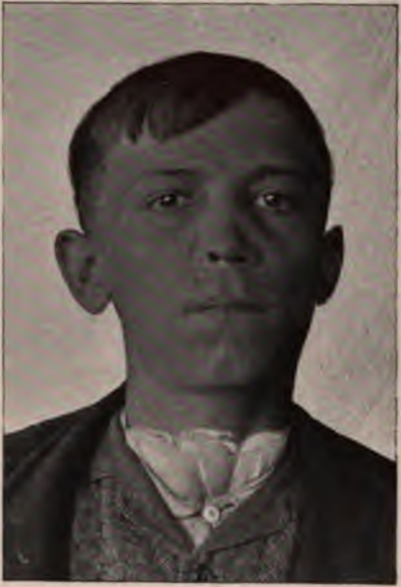
FIG. 4.—Inherited syphilis; showing external deformity of the nose. (Photographed by Dr. Hewetson.)

Temporary relief to the obstruction in the earlier stages may be obtained by the exhibition of weak solutions of cocaine or menthol; but care should be exercised, especially in the not only constant but occasional use of the former drug, as in young children its effects are often disastrous. The physician should be on the lookout for a too sudden cessation of the discharge, which sometimes occurs, and is followed by symptoms of septic infection.

II. SYPHILIS OF THE PHARYNX.

ACQUIRED PHARYNGEAL SYPHILIS.

The Primary Lesion.—The initial lesion of syphilis is occasionally found in the pharynx, and almost invariably on one of the tonsils, the posterior wall being singularly exempt. Sometimes the upper pharynx is the seat of the primary sore, and not a few cases are on record in which the constitutional disease was communicated by means of the Eustachian catheter.

The diagnosis of pharyngeal chancre is often a difficult matter, as the characteristics of the primary sore of syphilis are not always well marked, and the diagnosis must be made from the subsequent development of constitutional symptoms.

Secondary Lesions.—By far the most common lesions of syphilis in this region are erythema and catarrhal inflammation. A symmetrical arrangement of the erythematous patches is regarded as characteristic of syphilis. There is nothing peculiar to the pharyngeal catarrh of syphilis. In a certain proportion of cases, however, there is a somewhat characteristic discoloration of the mucous membrane, which is suggestive of the disease. When to this is added a tendency to symmetrical patches of cloudy swelling of the epithelium, suspicion of its specific nature may be aroused.

Mucous patches are constant accompaniments of pharyngeal syphilis, and are found most commonly on the soft palate, faucial pillars, and tonsils, rarely on the posterior wall. Varying in size, they appear as whitish or bluish-white elevations—circular, oval, or stratiform—arranged symmetrically on the swollen and hyperæmic mucous membrane. They may be fugitive in nature, disappearing spontaneously in a few weeks, or the epithelium may be cast off, and superficial ulcers result. The ulceration from a mucous patch is sometimes so extensive that it may be confounded with the destruction of a tertiary lesion.

Tertiary Lesions.—The characteristic lesions of the tertiary stage found in the pharynx are gummata, diffuse infiltration, and ulceration. I have also met with extensive fibroid degeneration of the pharyngeal structures similar to that described above. The mode of development of tertiary ulcers in the pharynx is identical with the manner in which they appear in the larynx (see section referred to). They are found in all portions of the upper and lower pharynx. When seated on the soft and hard palate they show a marked tendency to perforate.

The ravages produced by tertiary syphilitic ulceration of the pharynx are sufficiently familiar. In addition to the perforations already referred to, widespread destruction of the palate, tonsils, posterior wall, and other parts may occur; caries and necrosis of the posterior wall and pharyngeal vault may complicate the case, or extensive adhesions may form, with partial or complete obliteration of the pharyngeal cavities. Occasionally a perforating ulcer opens a large artery and alarming hæmorrhage occurs, or the ulcerative process may extend to the brain or spinal cord, with a fatal result.

CONGENITAL SYPHILIS OF THE PHARYNX.

Of great interest are syphilitic affections of the pharynx in the congenital form of the disease. The fauces, velum, and posterior wall present simply an erythematous efflorescence, or are the seat of lardaceous infiltration. Occasionally the follicles seem to be the starting point of the disease. They stand out prominently, are filled with a yellowish secretion, and are surrounded by a well-defined inflammatory areola.

Although mucous patches are frequently found on the uvula, tonsils, and faucial pillars, the posterior wall is singularly exempt. Hypertrophy of the tonsils is present in a large proportion of cases. It is simple in character, or the glands may be the seat of lardaceous infiltration. In the latter case they have a square outline, and a uniform, smooth, waxy appearance, in which it is difficult to recognize the mouths of the follicles and lacunæ.

Warty growths are found in the pharynx, both in the acquired and in the congenital form of syphilis.

With deep ulceration of the pharynx stomatitis is commonly associated. The parts are thickened, infiltrated, and present a characteristic albuminous appearance. On this pale ground ramify arborescent wine-colored vessels, and here and there small hæmorrhages are seen beneath the mucous membrane. There is often a scarlet line along the gums at the insertion of the teeth, which stands out in striking contrast to the surrounding pallor of the membrane. This is most easily determined by the carious condition of the teeth, and may be analogous to the inflammatory zone which surrounds other syphilitic lesions.

Morell Mackenzie has called attention to the absence of the characteristic notching of the teeth in those in whom the throat is affected. Out of seven cases examined by me in 1879, in reference to this point, there were three in which the notching was not present. In one of these there was a deficiency in the left central upper incisor, giving it a more or less V-shaped appearance, and in another a roughening of the lateral edge of the lower central incisor of the right side. In the third the teeth were apparently sound.

It is generally laid down in the text-books that deep ulceration of the mouth and pharynx in congenital syphilis is very rare; and Mr. Holmes (Surgical Treatment of the Diseases of Children, p. 350, London, 1868) went so far as to say that the affection of the palate, so common in syphilis of the adult, is "so rare in children that it is doubtful whether the few cases which occur in infants during syphilis may not be mere coincidences." A great deal of confusion prevails concerning this question, in consequence of the persistent adherence to the old superstition which regards them as of "scrofulous" origin. It is impossible to exaggerate the *rôle* of congenital syphilis in the production of the deep destructive pharyngeal ulceration of childhood. The subject is not one of purely pathological interest: under a misconception of its true nature, syphilis, uncontrolled, will lead to destruction and deformity, and influence for evil the future happiness and usefulness of the individual.

Deep ulceration may invade the bucco-pharyngeal cavities at any period of life from the first week up to the age of puberty. Out of thirty cases analyzed with reference to the period of invasion, fourteen occurred within the first year—a proportion of nearly one half—and of these, ten within the first six months. Whitehead (On the Transmission from Parents to Offspring of some Forms of Disease, p. 137, London, 1851) has observed putrid ulceration of the throat in an infant three days old. Of the remaining cases, the majority occurred at a period more or less advanced toward puberty.

It is an accepted fact that syphilis may lie in a state of potential activity within the system for many years after birth. Lying thus quiescent, it seems to await the advent of some physiological epoch to call its phenomena into activity. Thus puberty and its surrounding years is often selected as the chosen period of its outbreak. When the eruption of the disease is thus deferred, it is on the palate and in the pharynx that it most frequently makes its appearance, and deep palato-pharyngeal ulceration often first attracts attention to the existence of a diathesis of which it is the sole pathological expression. Lesions of these structures are found with a peculiar constancy, and upon them syphilis apparently concentrates all its energy and exhibits most of its virulence.

Females are attacked more frequently than males Out of sixty-nine cases of pharyngeal ulceration, forty-one occurred in the female sex.

That the pharyngeal cavity should be frequently attacked is easily understood, when we reflect upon its great vascularity and the irritation to which it is constantly subjected. Ulceration may occur in any situation, but its favorite seat is the palate, and especially the hard palate. When it takes place at the posterior part of the hard palate the tendency is to involve the soft palate and velum, and thence to invade the posterior nares and naso-pharynx. Seated anteriorly it seeks a more direct pathway to the nose by perforation of the bone.

Simultaneous or consecutive ulceration of the palate, pharynx, and nose seems to be characteristic of syphilis.

The next most common seats of ulceration, in the order of their frequency, are the fauces, the naso-pharynx, the posterior pharyngeal wall, the nasal fossæ and septum, the tongue and gums.

A peculiarity of these ulcers, and especially those of the palate, is their centrality of position. They are generally found in the median line of the vault, at the junction of the palatal processes of the superior maxilla, and the areas of destruction on either side are equal and symmetrical.

Often more acute in their development, and advancing with more rapid strides than in the tertiary syphilis of the adult, the special tendency of these ulcerations is to attack the bone and lead to caries and necrosis. Disorganization of the bone occurs in over three fifths of recorded cases. The great vascularity of the periosteum and medullary membrane in youth, doubtless, invites invasion of the osseous structures. This, however, is contrary to the experience of Colles (Venereal Diseases, p. 271, London, 1837), who never saw a case; of West (Lectures on Diseases of Children, p. 747), who has seen necrosis only once; of Holmes (*op. cit.*, p. 351), who has seen sloughing of the soft palate, but not excavated ulcers or caries of the hard palate; and of Cooper Foster (Surgical Diseases of Children, p. 291, London, 1860), who has never met with an example in which syphilis had advanced to disease of the bone.

The tendency to necrosis exists at all periods of life, but especially in early youth, at which time it is more destructive and less amenable to treatment. When ulceration occurs on the hard and soft palate, perforation of these structures takes place in very nearly one third of the cases.

As a rule, the ulcers originate upon the palate or within the pharynx, but they are also consecutive to deep, ulcerating syphilides of the nose and face. Whatever their point of departure, the palate is often the structure upon which the destructive process ultimately descends.

The palate, pharynx, and nose, then, constitute a well-defined territory singularly obnoxious to these ulcerative products, and within whose confines we may best study the development and growth of these degenerate lesions of syphilis.

Ulceration of the tongue occurs in a certain proportion of cases. I have met with it three times in congenital syphilis. In the first case the ulcer was situated on the right side of the tongue, near its tip; in the second, in the left glosso-epiglottic fossa; while the third followed the breaking down of a large gumma on the upper surface of the tongue near its base.

The ravages of the disease present the typical appearances that are found in the tertiary syphilis of the adult. The appearance of the ulcer will vary to a certain extent with the general condition of the patient. In a badly nourished, cachectic child the granulations may assume a pale, unhealthy, and indolent look, and the red corona may fade into a purplish ring, or even be entirely wanting. But in all there is a strict adherence to the true syphilitic type of ulcer.

As a result of cicatrization, adhesions may form between the velum and the pillars of the fauces, or between the latter and the pharyngeal wall, and there may be stenosis and obliteration of the pharynx and naso-pharynx; in fine, all the sequelæ are found which follow constitutional syphilitic ulceration in these localities.*

Prognosis in syphilis of the pharynx is generally good, provided the patient be seen before extensive destruction has taken place. In congenital syphilis it is greatly influenced by the age of the patient; the earlier the pharynx is attacked the graver the prognosis. Pharyngo-laryngeal ulceration occurring within the first year is almost invariably fatal. Pharyngeal ulceration appearing late, or as a manifestation of "tardy syphilis," yields readily to iodide of potassium, and the topical application of iodoform or the vapor of the iodate of zinc.

Diagnosis.—The separation of syphilitic ulceration of the pharynx from that of tuberculosis, lupus, lepra, and cancer should be made upon the principles of differential diagnosis laid down in the article on Syphilis of the Larynx. It should not be forgotten, too, that typhoid fever, diphtheria, and other acute systemic disorders may lead to destruction which resembles that of syphilis so closely as to render an appeal to the history of the case imperative. The soft palate and pharynx may also be destroyed by traumatic causes, or be badly scarred from chemical irritants. Sloughing may also occur from poisonous doses of drugs, such as mercury in its various forms.

Treatment.—This should be carried out on the principles indicated in the section on Syphilis of the Larynx. In my experience the best application to the mucous patch is the solid stick of silver nitrate, while for the tertiary ulcer iodoform may generally be relied upon as a rapid promoter of cicatrization. Adhesions may be divided with the knife or galvano-cautery, but unless serious interference with function is threatened they had better be left alone. Partial stenosis of the upper and lower pharynx may be treated by systematic dilatation with sounds, by divulsion, or by the use of the cautery or knife. When the stenosis is complete, and the pharynx is filled with dense fibroid tissue, the treatment will depend upon the circumstances of the case and the ingenuity of the surgeon. In cutting through the new-formed tissue in the nasal pharynx, it is always best to previously introduce a catheter or similar contrivance through the nose, upon which to cut as a guide. The results of treatment in this class of cases can not be said to be brilliant. The tendency to recurring stenosis is great, and the surgeon is fortunate who obtains a satisfactory permanent opening. Delavan, of New York, profiting by the observation of Andrew H. Smith—that the eschar after the use of monochloracetic acid remains attached until cicatrization has taken place beneath it—in a case of adherent velum, divided the adhesion with curved scissors and cauterized the raw surfaces freely with this acid. Although the surfaces remained in contact, no adhesion took place afterward, and the operation was a permanent success (Transactions of the American Laryngological Association, 1883, p. 185).

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* The views and conclusions given above were first published by the writer in the American Journal of the Medical Sciences for October, 1880.

III. SYPHILIS OF THE LARYNX.

Statistics differ widely as to the frequency with which syphilis attacks the larynx. While the space allotted to the present article precludes a critical examination of the sources of error discoverable in the antagonistic reports of different observers, it may be said, in general, that reconciliation of diverging opinions upon this subject can only be accomplished by taking the life histories of the cases upon which the statistical evidence is based. Were this method universally adopted, we believe that few syphilitics would be found who had not, at some period or other of the disease, suffered from some form of laryngeal affection.

The delicate structure of the larynx, the irritation to which it is exposed in the natural discharge of function, or in the unnatural exercise of the same from disease of adjacent and communicating organs, as the nose and pharynx, the common invasion of its structures in other forms of acute and chronic blood-poisoning, and its frequent exposure to a host of other unfavorable influences from direct or reflected irritation, furnish, *a priori*, grounds for regarding this organ as a frequent seat of the manifestations of constitutional and hereditary syphilis. The impairment of nutrition induced in its structures by the circulation within their substance of a vitiated fluid, and the consequent vulnerability of its mucous membrane to the causes that determine catarrhal conditions, predispose, among other things, to the phases of so-called secondary inflammation, while its wealth in fibrous tissue and fibro-cartilage doubtless invites invasion by the tertiary processes of the disease.

While it is therefore probably true that the majority of cases of constitutional or hereditary syphilis, if untreated or neglected, will sooner or later develop some phase of laryngeal disorder, it is equally certain that the eruption of the disease in the larynx can be prevented or modified by early therapeutic interference. As the virulence of syphilitic lesions in general is modified by the employment of the more advanced and rational methods for its cure, so the destructive affections of the larynx are less frequently met with now than in the time when the therapeutics of the disease were less perfectly understood, and when the exhibition of mercury to salivation was the catholicon of the profession.

Certain it is that the proportion of the more destructive forms of laryngeal syphilis is small, compared with their constancy and the terrible ravages to which they gave rise, as described by the writers of the fifteenth and sixteenth centuries. While, therefore, it is safe to affirm that the proportion of cases of laryngeal disease in syphilis has been notably diminished by the rational use of mercury, and especially by the tonic treatment of the disease, as formulated by Keyes (American Jour. of Med. Sci., January, 1876; also Tonic Treatment of Syphilis, New York, 1876), the injudicious use of that drug, on the other hand, may be looked upon as having contributed in the past in no small degree to the determination of the disease to the throat. For when we recall the extensive ulceration of the pharynx and larynx sometimes produced by mercurials, and the free way in which the latter were often administered (Colson, Journal Hebdom., 1831, p. 36; also Crampton, Trans. Dublin Coll. of Phys., vol. iv, p. 91, where two grains of calomel caused ulceration of the throat and death; and Devergie, Archives gén. de méd., tom. ix, p. 468, gangrene of the throat and death; also a case, Broadbent, Mem. of Lond. Med. Soc., vol. v, p. 112, in which globules of mercury were found upon the laryngeal cartilages after death), it is easy to conceive of the disastrous influence of their incautious administration upon structures peculiarly obnoxious to the ulcerative forms of syphilis.

The time elapsing between inoculation and invasion of the larynx varies greatly. Lewin (Die Behandlung der Syphilis mit Sublimat Injectionen, Berlin, 1869; Ziemssen's Encyclop., Am. ed., vol. vii, p. 862, New York, 1876), who has given this particular attention, asserts that the minimum period is from two and a half to three months; while in the well-known case of Türck the laryngeal affection developed thirty years after infection (*op. cit.*, p. 377).

The rarity of primary inoculation of the pharynx and tonsils precludes the framing of any definite conclusions concerning the rapidity of subsequent laryngeal invasion, nor has any relationship been established between the severity of the respiratory lesions and the size of the primary sore. Reasoning by analogy, however, it might be said that an early invasion of the larynx may be looked for in primary disease of the tonsils, and that the destructive tendency may vary with the character of the initial lesion.

The laryngeal lesions of syphilis are superficial and deep. Superficial changes usually appear early during the secondary stage of the disease, while the deeper, destructive lesions occur later, in the period of tertiary phenomena. The laryngeal inflammation is therefore, as a rule, associated with the corresponding external phenomena of these periods.* This relationship between the laryngeal and cutaneous lesion is, however, by no means invariable, especially as regards the superficial lesions, and even deep ulceration may be met with at an early period of the disease.

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* M. Dance has attempted to show that roseola, and even the tubercular and papular syphilide, occur in the larynx simultaneously with their eruption upon the external surface (Eruptions du larynx survenantes dans la periode secondaire de la Syphilis, Paris, 1864). These observations have never been confirmed.

It sometimes happens that laryngeal inflammation and ulceration appear many years after the constitutional malady has run its course, and the lesions of the pharyngo-laryngeal tract are occasionally encountered without antecedent cutaneous or visceral changes. In several cases seen by me, it was from the appearance of ulceration in the larynx that the patients and their attendants first became aware of the previous existence of the initial lesion. This remarkable tendency of syphilitic lesions to make their appearance in some portion of the upper respiratory tract long after the affection has apparently run its course, or without antecedent cutaneous and visceral phenomena, is especially worthy of note, and also the fact of their isolation, under these circumstances, in the nose, pharynx, larynx, or trachea, without disease of adjacent or communicating organs. Syphilis of the larynx is generally consecutive to inflammatory changes in the pharynx or nasal passages, but occasionally occurs as an independent affection. In rare instances it is the result of extension from the trachea. The age at which the disease appears will depend, of course, upon the time of infection, and as men are more disposed to the exciting causes of inflammatory affections of the larynx, it is more frequently met with in the male sex.

The experience of the writer as regards the relative frequency of secondary and tertiary lesions is in favor of the more common occurrence of the former, if the simple catarrhal affections of that period be included under the head of true syphilitic phenomena.

Varieties.—The lesions of laryngeal syphilis are pathologically separable into two main groups, corresponding to the secondary and tertiary periods of the constitutional affection. In addition to these, there is a class of case which can not be assigned to either extreme, and which belongs to what Whistler (Lectures on Syphilis of the Larynx, London, 1879) has aptly termed the "intermediate" period.

I. **Lesions of the Secondary Period.**—In this stage the mucous membrane and submucous tissues are the structures involved, and the appearances consist either in transient or permanent hyperæmia, or in well-defined catarrhal inflammation. The former presents nothing characteristic; the latter is differentiated from simple inflammation by the less pronounced character of the hyperæmia, and by the tendency to multiple superficial ulceration. There is, however, nothing absolutely characteristic in the anatomical appearances of this form of syphilis. The mucous membrane is, as a rule, paler than normal, sometimes even almost white, and the presence of minute ulcers, especially in number, and associated with similar appearances in the pharynx, is of value in the anatomical diagnosis of syphilis.

In the laryngoscopic image the existence of a brownish-red mottled appearance of the vocal cords, especially if the condition be symmetrical, together with erosions or superficial ulceration of the edges of the vocal cords, on the free border and posterior surface of the epiglottis or ventricular bands, should lead to a suspicion of the specific nature of the inflammation.

While these appearances furnish strong presumptive evidence in favor of the existence of syphilis, it were more prudent to look for other phenomena and historical data before giving a decided opinion. The ulcers of this period are either follicular in origin or result from the breaking down of the more superficial portions of the mucous membrane. These minute losses of substance often coalesce to form a large ulcer with well-defined, elevated wall and grayish-mottled base, which in healing leaves a small, somewhat depressed cicatrix. This latter, from a clinical stand-point, offers weighty evidence in favor of syphilis. Whether ulceration of the laryngeal mucous membrane ever results from inoculation by the pharyngeal secretion can not be affirmed with any degree of positiveness.

Mucous Patches and Condylomata.—The utmost confusion prevails concerning the occurrence and frequency of mucous patches in the larynx. While their existence in this organ is strenuously denied by some who have specially investigated this subject, the very opposite opinion is entertained by equally competent observers. In a large number of patients with laryngeal syphilis that have come under the observation of the writer, he recalls but one case concerning the nature of which there could be little doubt.* The failure to detect the presence of mucous patches in the larynx may be due, as Morell Mackenzie (Diseases of the Throat and Nose, vol. i, p. 356, London, 1880) observes, to their fleeting character; while, on the other hand, it is highly probable that many of the so-called mucous patches described by writers are in reality nothing more than papillomatous excrescences or small ulcerating gummata.

The laryngeal mucous patch, so called, appears in the mirror as a grayish-red or whitish-yellow elevation, rounded or oval in contour, and surrounded by an inflammatory areola. This may disappear completely, or disintegration and ulceration may ensue. Small papillary hyperplasiæ not infrequently occur in the neighborhood of existing ulcerations or on the confines of an old cicatrix, which should, however, not be confounded, as has been done, with true condylomata.

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* The subject was a woman suffering from secondary syphilis. On the left vocal cord, about its center, was a small, oval, yellowish-white patch, smooth in contour, and slightly elevated above the surface of the cord. Its long diameter was parallel with the free border of the cord, and its base surrounded by a scarlet inflammatory areola. The laryngeal membrane was slightly erythematous. Three days after this both patch and areola had disappeared.

II. **Lesions of the Intermediate Period.**—These have been well described by Whistler. The anatomical peculiarity of this stage resides in a chronic diffuse laryngitis, characterized by its constant tendency to relapse, and by the existence of ragged ulceration of the vocal cords. The ulcers, in fact, represent, so to speak, a transition stage from the superficial destruction of the secondary to the deeper and more malignant ulceration of the tertiary period.

The ulceration of both the secondary and intermediate periods occasionally extends to the fibro-cartilaginous structures, but the latter complication is much more frequently due to ulceration of tertiary development.

III. **Lesions of the Tertiary Period.**—In this stage all the structures of the larynx may be involved, singly or in combination. The proclivity of syphilis to attack those cartilages only that are invested with perichondrium applies with especial force to the cartilaginous structures of this organ. The characteristic lesions of this period are gummata, deep ulceration, and fibroid degeneration.

1. *Gummata* appear as solitary or multiple tumors of varying size and shape, and of smooth, regular contour, which may proceed from any of the laryngeal structures, but which are usually found in the submucous tissue of the free border and posterior surface of the epiglottis and the interarytenoid space. They are occasionally met with in the subglottic region, on the ventricular bands and on the vocal cords. They vary in size from that of a mustard seed to a tumor that calls for tracheotomy.

The color of the mucous membrane covering the gumma is at first intensely red, and occasionally small vessels are developed in its vicinity. Gradually, under the increased pressure of the submucous deposit, it becomes pale, thin, and transparent, so that the peculiar yellow or whitish-yellow color of the gummatous infiltration is distinctly visible. Necrosis of the anæmic membrane soon follows, and an ulcer results which rapidly invades the submucous tissues, forming a more or less craterlike excavation, not infrequently involving the perichondrium and underlying cartilage. In small gummata absorption of the infiltration may be secured by the exhibition of antisyphilitic remedies, even after considerable thinning of the mucous membrane has taken place.

In histological structure the laryngeal gumma does not differ from similar products in other parts of the body.

An isolated case is on record in which giant cells were found in the gummatous infiltration of the larynx (Browicz, Centralblatt f. die med. Wissenschaft, 1877, S. 346), but this is probably an exceptional and accidental occurrence.

Well-defined gummatous tumors of the larynx are comparatively rarely met with as compared with diffuse syphilitic infiltration.

2. *Fibroid Degeneration.*—In the later stages of tertiary syphilis there is in a certain proportion of cases a decided tendency to the gradual development of fibroid tissue in the structures of the larynx, which tends to diminish the lumen of the organ, not only by contraction of the new-formed tissue but also by the production of large, dense, fibroid tumors, which are often mistaken for and described as gummy tumors, but which pathologically have nothing in common with them. These fibroid tumors appear as hard, nodular masses occupying the epiglottis, aryepiglottic folds, and other portions of the vestibule and subglottic region. Sometimes the greater portion of the organ is converted into a dense hypertrophic mass. Acute ulceration occurs, and is fraught with great danger from accompanying œdema, and each succeeding attack of ulceration favors a greater deposit of fibrous tissue and increases proportionately the gravity of the case. In this variety of laryngeal syphilis, which Whistler has especially insisted upon, no retrograde metamorphosis takes place; its processes are essentially progressive, and the caliber of the larynx becomes diminished sooner or later by an irregular nodular mass—half hypertrophied tissue, half cicatricial bands—which does not subside under internal or local treatment, and which, if extensive, demands tracheotomy.

These fibroid tumors may be differentiated from gummata by their pale, grayish or whitish appearance, by the surrounding anæmia of the mucous membrane, and by the absence of the peculiar yellowish submucous discoloration of the latter. The hard, dense sensation communicated to the probe contrasts forcibly, too, with the soft elastic feel of the gummy growth.

This class of case is only seen in hospital or dispensary practice, and presents a long history of neglected laryngeal trouble with gradually increasing obstruction to respiration. These tumors are more common than is generally supposed, and probably constitute a large proportion of the specimens which are labeled "gummata" in anatomical museums and collections.

Sections of the growths show, under the microscope, thickening of the mucous membrane, a round-cell infiltration of the submucous tissues, and abundant meshes and wavy bands of fibrous tissue, which, in contracting, obliterate more or less completely the vessels and glandular elements of the parts. Whether this fibrous tissue starts from the perichondrium or submucous layer, or both, or what relation it bears to the fibroid hyperplasiæ which are found after the cicatrization of ulcers, has not as yet been made out, but it is not improbable that this hypertrophic syphilitic laryngitis may be due to the combined action of these different factors.

3. *Tertiary Ulceration.*—Ulcers of the tertiary period result from atrophy of the mucous membrane, through the pressure of the underlying infiltration and the consequent purulent degeneration of the latter, and in

this way excavations are formed of more or less circular outline, with a deep base of grayish or lardaceous appearance, and with elevated, clearly defined, and often bloodshot walls, surrounded by a scarlet zone of inflammation, and covered with a foul, dirty yellowish secretion, which imparts to the breath a peculiar and somewhat characteristic odor.

Of varying sizes, the tertiary ulcer may be multiple, and occur in any portion of the larynx and subglottic space; but it is generally solitary, and occupies by preference the lingual surface and the free edge of the epiglottis. It may be said that, in general, the ulceration of the upper part of the larynx is much more common than ulceration of the cords and subcordal region. The ulcerative process not infrequently extends along the aryepiglottic fold to the ventricular band, or from the latter to the ventricles. The epiglottis may present a crenated appearance like the comb of a cock, or a punched-out aspect; or it may be depressed in various other ways. Occasionally it is perforated. It may be reduced to a mere rudiment, or finally be completely destroyed.

Syphilitic ulceration of the larynx heals by peripheral cicatrization, as has been well described by Virchow. Around the borders of the ulcer dense, callous connective tissue makes its appearance, which is characterized by excessive peripheral growth, as in the cicatrix following a burn. The resulting scar varies in appearance, according to the size and situation of the original ulcer. On the ventricular bands and free surface of the epiglottis it is generally star-shaped, while in other situations fibrous bands are formed which connect them with, or bind them down upon, adjacent structures.

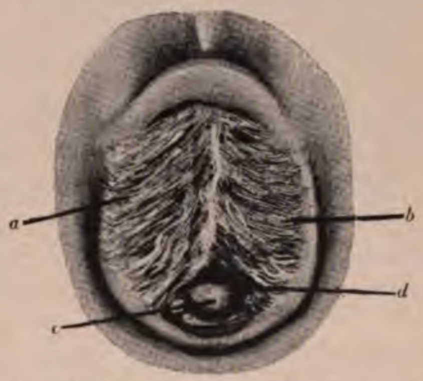

Fig. 5.—Inherited tertiary syphilitic stenosis of the larynx. The ventricular bands converted into two enormous tumor-like bodies which have invaded and blended with the aryepiglottic folds, and which have become adherent in the middle line from union of opposed ulcerated surfaces, *a*, *b*. The stenosis is rendered almost complete by a gummatous deposit in the meso-arytenoid commissure, *c*. The dark space just above this deposit (*d*) represents all that remains of the normal lumen of the larynx. (From nature.)

As the ulcers heal there spring up at the periphery of the cicatrices small papillary or fibroid hyperplasiæ, and thus, later on, small areas are found decked with growths which mark the site of past ulceration.

The deformities which result from the cicatrization of large ulcers are quite characteristic. The epiglottis may be bound down to the base of the tongue, to the lateral and even posterior pharyngeal wall, adhesions may form between its free edges and the aryepiglottic fold, between the latter and the ventricular bands and pyriform sinuses, and between the free edges of the ventricular bands; or the whole interior of the larynx may be converted into a contracted cicatricial channel in which all trace of the original anatomy of the part is lost (Fig. 5). Occasionally the larynx as a whole is displaced, or individual parts are thrown into unnatural positions by the contraction of the new-formed tissue. When ulceration occurs on surfaces that are brought in contact in the natural exercise of function—as, for example, the vocal cords—membranous formations composed of cicatricial tissue are occasionally developed between the opposing ulcerative surfaces, thus forming a web between them—a condition which has been especially well described by Elsberg (Syphilitic Membranoid Occlusion of the Rima Glottidis, New York, 1874).

If cicatrization be not promoted, the ulcers rapidly descend to the perichondrium, purulent inflammation of that structure is established, and the cartilage laid bare.

Perichondritis and necrosis of the cartilages may also develop as a primary affection—possibly, though rarely, as a metastatic (septic) inflammation of the fibro-cartilaginous tissue. The cartilage thus becomes surrounded by a purulent infiltration, which takes place beneath and in the meshes of the perichondrium, caries occurs, and the necrotic portions are expelled as a granular detritus or as well-formed sequestra. Sometimes an entire cartilage is expelled in the effort to expectorate. While expulsion of necrotic cartilage usually takes place by the mouth, it occasionally happens that the necrosed plate falls into the trachea and causes death. The entire epiglottis has also been found in the stomach.

The presence of necrotic cartilage in the larynx, apart from other dangers to which it may give rise, aggravates the existing local disease, increases suppuration, and may even lead, if not artificially extracted, to metastatic abscesses in various parts of the body, to pyæmia and death.

If perichondritis does not result fatally, recovery takes place, at the expense of the functions of the larynx, with permanent anchylosis, with consequent paralytic affections and diminution in the caliber of the larynx, or fistulous tracts may be established between the cartilage and interior of the larynx, or may connect the former with the external surface.

A remote danger from tertiary laryngeal ulceration is death from hæmorrhage, as in the classical case of Türck (Klinik der Krankheiten des Kehlkopfes, 1866, S. 413), in which the laryngeal artery was opened, and in the one mentioned by Rokitansky (Path. Anat., Bd. iii, p. 22), in which sudden death occurred from perforation of the aorta.

In all forms of tertiary syphilis of the larynx and in the deeper ulceration of the secondary and intermediate periods there is a tendency to acute and chronic œdema. The former occurs suddenly, and is sometimes the immediate cause of death; the latter develops slowly, and in some instances without danger to life, while in others it causes progressive dyspnœa, which may terminate fatally by sudden increase of the serous infiltration.

Symptoms and Complications.—It is manifest, from the above, that the symptoms and complications of laryngeal syphilis are of the most varying nature, and may consist in very slight modification of the vocal and respiratory functions or in their complete destruction; and even, secondarily, abrogation of the process of deglutition.

Diagnosis.—The distinctive points of difference between the diffuse laryngitis of the secondary period and simple catarrhal inflammation have been already given. The older writers laid great stress upon a peculiar raucous character of the voice as diagnostic, and the *vox rauca syphilitica* was placed among the pathognomonic symptoms of the disease. This quality of the voice is, however, met with when the vocal cords are congested, thickened, or abraded from simple inflammation, and can not, therefore, be looked upon as characteristic of syphilitic laryngitis; though it may be of value in differentiating the latter from tubercular inflammation.

In the earlier laryngeal affections of tuberculosis the pronounced pallor of the mucous membrane of the pharynx, larynx, and nasal passages, the tendency to swelling and congestion of the posterior and inferior portions of the larynx, together with a hyperæsthetic condition of the upper air-passages, and especially the pharynx, and the slow development and persistence of the ulcers (generally on the vocal processes), will lead to an examination of the lungs, where evidences of commencing consolidation are generally to be found. In doubtful cases, in which such evidence is wanting at the apices, I have repeatedly discovered signs of a localized bronchitis between the scapulæ, and the diagnosis has been verified by the subsequent development of the case.

Tertiary syphilitic ulceration of the larynx, and that which occurs in the intermediate period, may be confounded with that of tuberculosis and carcinoma.

From tuberculosis it may be differentiated by attention to the following points: Syphilitic ulcers are usually single, develop rapidly, and are preceded or accompanied by localized unilateral swelling of the mucous membrane or by gummatous growths. Tubercular ulcers, on the other hand, are generally multiple, are slow in development, and are preceded, as a rule, by a peculiar lusterless, opaque thickening of the membrane (tubercular infiltration). This may, in turn, be distinguished from the œdema which complicates syphilis, in that the latter is commonly unilateral, or confined to the parts principally affected, is glistening, more or less translucent, and does not partake of the opaque, dull color of tubercular deposit. When the latter leads to the peculiar pyriform swelling of the aryepiglottic folds or to the turban-shaped epiglottis, it furnishes almost pathognomonic proof of tuberculosis. Syphilitic ulcers are larger, as a rule, than tubercular ulcers, and their favorite seats are the anterior surface and free edge of the epiglottis, while tubercular ulceration is most frequently encountered in the lower and posterior portions of the larynx and on the ventricular bands. When tuberculosis attacks the epiglottis it is generally the lower and posterior surface that is involved, and it may be said, in general, that the tendency of syphilitic ulceration is to develop from above downward, that of tuberculosis from below upward. Bilateral ulceration of the larynx, and especially of opposing surfaces, other things being equal, is in favor of tuberculosis.

Deformity always results when any of the laryngeal structures—as, for example, the epiglottis—is perforated from syphilitic ulceration, while the perforating ulcer of tuberculosis has little or no effect upon the natural shape and position of the cartilage. The syphilitic ulcer is deep, cleanly cut, with well-defined shelving walls (*vide supra*), is surrounded by an inflammatory areola, and rapidly invades the submucous tissues; the tubercular ulcer is surrounded by an anæmic mucous membrane, is more shallow, presents a characteristic, worm-eaten appearance, and tends to spread laterally in an irregular or serpiginous manner.

The secretion from tubercular ulceration is usually very profuse, accumulates with great rapidity, and gives to the breath a peculiar, sweetish odor that is quite characteristic. Microscopic examination, moreover, will generally detect the presence of Koch's bacillus, which may be looked upon as possessing a certain crucial diagnostic value. In syphilis, on the other hand, the secretion is by no means as great, nor does it accumulate with the rapidity observed in tuberculosis. Syphilitic ulceration, especially if the pharynx be involved, gives to the breath, moreover, a peculiar fetid odor, which may be regarded as diagnostic.

Hæmorrhage from the larynx is not uncommon in tuberculosis, and is rare in syphilis. Syphilitic ulceration tends to heal by peripheral cicatrization; it is doubtful whether *very extensive* tubercular ulceration ever completely heals. The presence of cicatrices in the larynx is *prima facie* evidence of syphilis, and when these assume their characteristic form there can be little doubt concerning the diagnosis.

Small fibrous outgrowths in the neighborhood of ulcers and cicatrices are additional evidence in favor of syphilis, while papillary hyperplasiæ, occurring in the interarytenoid fold and especially when they appear in the early stages or precede well-marked changes in the larynx, should awaken suspicion of tuberculosis (Stoerck, Klinik der Krankheiten des Kehlkopfes, etc., Stuttgart, 1880, S. 282; Major, Trans. Am. Laryng.

Assoc., 1883, p. 163). While, moreover, small granular or papillary hyperplasiæ are sometimes found covering the base of tubercular ulceration,* no growth ever rises from that of a syphilitic ulcer or from the resulting cicatrix. Papillary hyperplasiæ are not uncommon in syphilis, and generally mark the seat of past ulceration, as indicated by the presence of a cicatrix or other evidence of pre-existing localized destruction. The papillomatous excrescences of tuberculosis tend in time to ulcerate and break down; those of syphilis rarely, if ever, ulcerate.

Syphilitic ulceration is, as a rule, not painful, nor is the larynx tender to pressure except where the deeper structures are involved. Deglutition is also accomplished with ease, except in active ulceration of the epiglottis, when the pain is sometimes severe. In tubercular ulceration, on the other hand, especially when the food comes in contact with the ulcerated surface, swallowing is intensely painful and sometimes impossible.

In tuberculosis the respiration is always more or less embarrassed, and the voice is enfeebled and veiled, from insufficiency of the expiratory forces; while in syphilis, unless the vocal cords be involved, the phonetic quality of the voice is not necessarily impaired. In the differential diagnosis between tuberculosis and syphilis the so-called *vox rauca* may be accepted as a sign of the latter.

The presence of cicatrices or active ulceration in the pharynx, on the palate, or in the nasal cavities carries with it weighty evidence in favor of syphilis, the condition of these structures in advanced tuberculosis being commonly that of anæmia associated with more or less catarrhal disease. Extensive ulceration of the pharynx in tuberculosis is much less frequently met with than destructive lesions due to tertiary syphilis.

By attention to the above differential points between the two diseases a mistake can rarely occur. It must, however, be admitted that cases arise in which an appeal to the historical narrative of the case, the physical examination of the lungs and other organs, and even treatment, may be necessary, before giving a positive opinion. It should be remembered, too, that syphilis and tuberculosis are occasionally combined in the larynx, and that such a condition can only be recognized by the eye of a skilled observer.

The deformities which result from tertiary syphilis may be said to be practically characteristic; but it is well to call attention to the fact that certain essential fevers—e. g., typhoid, smallpox, etc., and diphtheria—

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* The gummata of syphilis may possibly be confounded with tubercular tumors of the larynx, that rare form of tuberculosis first described by the writer of this article in 1882 (N. Y. Archives of Medicine, October, 1882), and of which other cases have since been recorded by Schnitzler (Wiener med. Presse, Nos. 44 and 46, 1883), Percy Kidd (Clin. Soc. Trans., London, vol. xvii, p. 154, and St. Bartholomew's Hosp. Rep., vol. xxi), and others.

occasionally give rise to ulceration of the nasal passages, pharynx, and larynx, with perforation of the septum, ozæna, loss of the palate, epiglottis, etc., which present all the gross appearances of syphilis, and which can only be differentiated from the destruction of that disease by the history of the case. This is especially worthy of remembrance, lest in the after-life of the individual the previous existence of syphilis be too readily assumed from a perforation of the septum or the loss of the uvula or palate.

Much more difficult is the differentiation of syphilis and cancerous ulceration occurring in the larynx. The chief points to take into consideration here are the following: Cancer is a disease which occurs usually after the fiftieth year of life, which develops less rapidly than syphilis, and most commonly originates from the space between the vocal cords and ventricular bands (except when it descends from the pharynx) as a more or less clearly defined nodular growth, which subsequently ulcerates and is converted into an ulcer with bloodshot walls, whose base becomes covered later with fungous, bleeding granulations. Associated with this, or preceding its development, are usually evidences of œsophageal obstruction, with pain on swallowing, pressure, or manipulation with the bougie.

Lancinating pain in the larynx, when at rest, radiating to the ear of the affected side, is often present, although it can not be considered as characteristic, as it may occur in any ulcerative disease of the larynx. As the ulcerative process of cancer advances, extensive hæmorrhages not infrequently take place—an uncommon occurrence even in extensive syphilitic ulceration.

The secretion of cancer is profuse, ichorous, and differs materially in odor from the peculiar sickening stench of the discharge produced by syphilitic ulceration. Examination under the microscope will occasionally determine the nature of the case.

Cervical, glandular enlargement is uncommon in laryngeal cancer, but is not infrequently associated with tertiary syphilis of the larynx.

While the above may serve as reliable guides to diagnosis, every experienced specialist can recall cases in which the latter could only be determined by resort to the sovereign test of treatment. Indeed, in any case in which the slightest doubt exists, it is the part of prudence in this as in other problems of diagnosis to give the patient the benefit of the doubt.

Prognosis.—The treatment of syphilitic affections of the larynx is generally very satisfactory, unless the cartilages and their envelopes be attacked. Even then a cure may be effected if the necrotic cartilage be removed. In deep-seated destruction a cure can only be obtained with permanent injury to function.

The complications and dangers to life from tertiary syphilis have already been alluded to in treating of the pathology of the disease. The possibility of the sudden occurrence of œdema, even in the ulcerative laryngitis of the intermediate period, should never be lost sight of, and the danger of the latter increases, in every stage, as the perichondrium is approached.

It is generally possible to produce complete cicatrization of tertiary ulceration, but when the latter is extensive, such an event is only accomplished with considerable deformity or contraction of the larynx. Ulceration occurring in the subglottic region and in the neighborhood of the cricoarytenoid joint is more dangerous to life than when the epiglottis and ventricular bands are attacked. The entire epiglottis may be destroyed without serious impairment of the laryngeal functions, and without impediment to deglutition.

In fibroid degeneration, when extensive hypertrophy has taken place, no good has as yet come from constitutional or local treatment, and the patient drifts sooner or later to tracheotomy. Perhaps some good could be accomplished by the use of acids, electric cautery, and other destructive measures, with or without a preliminary tracheotomy in this apparently hopeless class of cases.

If properly treated, the prognosis in simple syphilitic catarrh, with or without ulceration, is good, and a permanent cure can often be accomplished. In other cases relapses of the ulcerative process occur from time to time. In both, the prognosis is influenced by the previous timely treatment of the constitutional disease. Finally, all syphilitic lesions of the larynx are rendered less amenable to treatment by the predisposition to or coexistence of serious organic disease, as, for example, tuberculosis.

Treatment.—The treatment of laryngeal syphilis is both constitutional and local. While there is, perhaps, no disease of the larynx that calls for more careful local methods of cure than syphilis, and in which the prognosis depends so much upon the early laryngoscopic recognition and appropriate topical treatment of its manifestations, the successful accomplishment of the latter is nearly always assisted by and often dependent upon the exhibition of constitutional remedies. Especially is this true of the tertiary lesions of the disease. To neglect general antisyphilitic medication when an ulcer is approaching the perichondrium, or when the destruction of important parts is menaced, is, to say the least, an unsafe and injudicious experiment.

The development and permanency of secondary laryngeal lesions are also influenced in a great measure by the early adoption of constitutional measures, for the latter not only assist in the removal of the infiltration, but in some instances act as a safeguard against inflammatory disease.

The different methods of administration of antisyphilitic remedies are given elsewhere in this volume. The writer can recommend the tonic use of mercury, as formulated by Keyes, in the treatment of syphilitic affections of the larynx. The most direct way of producing both the local and general effects of the drug is by mercurial fumigation or vapor baths.

The *local treatment* of the diffused laryngitis of secondary syphilis does not differ materially from that of simple catarrhal laryngitis. Should ulceration occur, iodoform may be freely used. In the deeper form of ulceration this drug is of inestimable service, and is, in the writer's experience, superior to iodine and the nitrate of silver. Sprays of the bichloride of mercury, or the local application of the yellow oxide in cosmoline, vaseline, or like substance, are also of considerable value. Before applying these remedies the ulcerated surface should be thoroughly cleansed by means of a detergent and disinfectant spray, for otherwise much of the good effect will be lost.

Papillomatous growths may be dissipated by the local application of alcohol or chromic acid, or, if extensive, may be removed at once with the forceps. Membranous webs may be successfully divided with the galvano-cautery (Elsberg) or by cutting dilators, the best of which is that devised by Whistler.

Whether any good can be accomplished by the division of adhesions must be determined by the peculiarities of the individual case. Except when function can be restored, or serious dyspnœa or dysphagia mitigated by the operation, it is better, as a rule, to let them severely alone.

Serious interference with respiration from any complication calls for tracheotomy, and the early performance of the latter is especially to be advised when the larynx has undergone the fibroid degeneration described above. Systematic dilatation of the larynx is sometimes of value, but, as a rule, little can be expected of this line of treatment beyond temporary improvement, while it is much inferior to the cutting operation.

Loosened necrotic plates of cartilage, in view of the dangerous complications to which they may give rise, should be removed, if practicable, by endolaryngeal operation or from without by exsection.

IV. SYPHILIS OF THE TRACHEA AND BRONCHI.

The individual portions of the respiratory apparatus possess a decidedly varying disposition to the localization of syphilitic lesions. When the notable frequency with which the nose and larynx are involved during the course of constitutional syphilis is contrasted with the comparative rarity of affections of the trachea and bronchi, it may be with safety said that the lesions of syphilis are more frequently found in the upper than in the lower segments of the respiratory system.

Syphilis of the Trachea.—Tracheal syphilis is of relatively rare occurrence, though not as uncommon as statistics would lead us to believe. Many cases of tracheal syphilis are doubtless overlooked, and especially is this true of those isolated inflammatory and ulcerative conditions which are found in the lower portion and at the bifurcation of the windpipe. In a large proportion of cases the tracheal affection is secondary to and consists simply in the extension downward of infiltration and ulceration of the larynx; it occasionally involves the whole length of the trachea, and even the bronchi, in its destructive action.

Much less common is the existence of syphilis of the trachea without associated or pre-existing lesions of the larynx and pharynx, or at least which is not the result of extension, but which occurs as an independent affection. When the syphilitic disease is thus isolated it is usually in the lower third of the trachea, from which it extends into the bronchi, or the latter may themselves be the seat of isolated syphilitic lesions.

Isolated syphilis of the upper third is much less commonly met with, and may occur alone or in combination with lesions of the lower trachea and bronchi. Usually both bronchi are affected. When one alone is involved it is more frequently the right. Only two cases are on record of isolated syphilis of the windpipe in its entire length (Zurhelle, Berliner klin. Woch., 1872, No. 35; Wilks, Guy's Hosp. Rep., ix, 1863), while the isolation of the disease in the middle third is so rare that the possibility of its existence in this locality has been denied. This condition has, however, been found and described by the writer (Wiener med. Jahrbücher, 1881, i. Heft. p. 75 *et seq.*) of this article, who at the time of publication could find but two similar cases in literature (Charnal, L'Union Médicale, 1859, No. 21; Beger, Deutsch. Arch. f. klin. Med., 1879, S. 608), to which a fourth has been added by Felix Semon (London Lancet, vol. i, pp. 905, 906, 1882).

Pathological Anatomy.—The changes met with in the trachea are identical with those found in the larynx during the secondary and tertiary period, with certain differences of appearance due to peculiarity of anatomical structure.

Mucous patches in the trachea are liable to be overlooked. Morell Mackenzie (Diseases of the Throat and Nose, vol. i, p. 531, London (1880), states that he has found them five times. Seidel (Jenaer Zeitschr. f. Med., 1866, S. 489, Canstatt, 1866, S. 497) described as a mucous patch a pale-red excrescence, the size of a pea, which was associated with condylomata in other parts of the body, and which disappeared without local treatment. Diffuse superficial inflammation, with or without ulceration, fibroid degeneration, gummatous growths, deep ulceration involving the perichondrium and cartilages, leading to peritracheal abscesses, exfoliation of necrotic tissues with subsequent fistulous communication with the exterior, membranous formations and stricture from the cicatrization of ulcers, are all observed, either alone or combined in the course of constitutional syphilis.

The ulceration generally descends from the larynx along the inner surface of the tube, presenting a more or less irregular spiral form or peculiarly forked appearance. In other cases the long diameter of the ulcer is at right angles to that of the trachea, which it surrounds in a circular manner. Usually single, the ulcers vary in size, sometimes extending the whole length of the tube, and even to the first division of the bronchi.

The stenosis which follows the contraction of the cicatricial tissue may affect the tube as a whole, whose lumen it sometimes obliterates almost completely, or the obstruction may be confined to its individual segments. The most common seat of obstruction is the lower third.

An extreme degree of stenosis occurred in a patient of mine at the Johns Hopkins Hospital. The young man had had a chancre five years prior to consulting me, and for eighteen months had suffered from gradually increasing dyspnœa. I found bilateral paralysis of the abductor muscles. He was sent at once to the hospital, where tracheotomy was done by the house surgeon, but no relief was obtained. The dyspnœa grew progressively worse, and expiratory dyspnœa was added to the inspiratory difficulty. This indicated obstruction below the seat of operation. The patient sank, and in a few days died. On post-mortem examination, made by Prof. Welch, no trace of syphilis was found in any part of the body except in the respiratory organs. In the apex of one lung a large gumma was found. Both recurrent nerves were compressed, and were found in a mass of half-cicatrical tissue and half-enlarged glands. There was pressure on both recurrent nerves, and the trachea at its bifurcation was so narrowed by the gummatous infiltration and contraction following ulceration that it was with the greatest difficulty that a very fine probe could be forced through the stricture. There were other ulcers in a state of cicatrization in the neighborhood. Certain fibers of both recurrent nerves were in a state of fatty degeneration. The starting point of all the trouble seemed to be the gummy deposit in the lung.

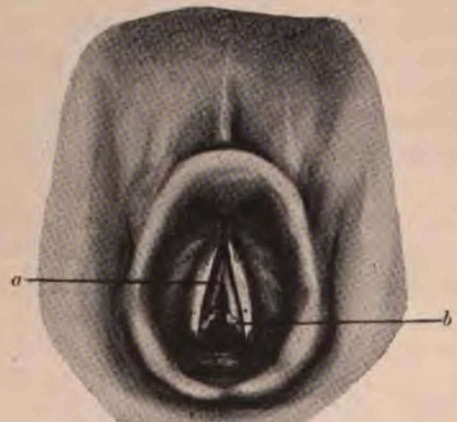

Fig. 6.—Excentric stricture (syphilitic) of the trachea. *a*, cicatricial subglottic tracheal web; *b*, fibrous outgrowth. (Drawn from nature by Dr. J. R. Winslow.)

The stricture which results from the cicatrization of a tracheal ulcer is of two kinds—excentric (Fig. 6) and concentric. The former is produced by irregularities or deformities of the tube from the healing of longitudinal or imperfectly annular ulceration, or as the result of perichondritis. In annular or concentric stricture there is often dilatation of the trachea above and below the constriction, forming, so to speak, an hour-glass appearance. The cicatrices do not differ materially from those found in the larynx. They either present a peculiar netlike form, or resemble the scars found in the œsophagus from corrosions (Förster). In one of my cases the cicatrix presented a remarkable resemblance to a sheaf of wheat.

Prognosis.—The prognosis of tracheal syphilis is, other things being equal, much less favorable than when the disease attacks the larynx, and it becomes graver as the bifurcation into the bronchi is approached. Extensive ulceration, especially when occurring in the lower third, or when it involves the bronchi, is generally fatal; while in obstruction in the upper third life may be prolonged by resort to tracheotomy or to systematic dilatation. In addition to the usual dangers from stenosis, perichondritis, etc., death has been known to occur from hæmorrhage, due to perforation of the ulcer into the aorta (Rokitansky, Patholog. Anatomie, Bd. iii, p. 22; Wilks, Trans. Path. Soc., vol. xvi, p. 52), and into the pulmonary artery (Gerhardt, Arch. f. klin. Med., vol. ii, p. 541; Kelly, Trans. Path. Soc., vol. xxiii, p. 45). In other cases the ulcer has perforated into the mediastinum (Wallmann, Virchow's Archiv, Bd. xiv, p. 201) and into the œsophagus (Beger, *loc. cit.*, and Axel Key and Oscar Sandhal, cited in Schmidt's Jahrbüch., 1870, 147, p. 48).

Symptoms.—Syphilis of the trachea may run its course without the production of any symptoms during life, or it may give rise to those of the most alarming and dangerous forms of stenosis.

CONGENITAL SYPHILIS OF THE LARYNX, TRACHEA, AND BRONCHI.

Isolated cases of laryngeal lesions in congenital syphilis are to be found scattered here and there through medical periodicals, but systematic writers have either entirely ignored the subject, or referred to a few recorded cases as pathological curiosities. The universal sentiment of authority has, until quite recently, been decidedly adverse to the frequent dangerous implication of the larynx, and the changes in the voice* are referred to the intervention of fortuitous catarrh.

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* As early as 1837, Dr. Abraham Colles, of Dublin, called attention to a hoarse cry as a symptom of congenital syphilis, and referred to the fact that when the voice became hoarse the affection of the anus might be shortly expected (Pract. Observ. on the Venereal Disease, etc., London, 1837, p. 269). Rosen, a distinguished Swedish physician, is cited by Mahon and Lamauve (Recherch. importantes sur l'éxistence, la nature et la communication des mal. syph., etc., p. 371, Paris, 1804) as mentioning a hoarseness occurring without manifest cause, and difficult deglutition, as symptomatic of congenital syphilis; but, on referring to the English translation of Rosen's work, I find that the sentence relates not to the inherited syphilis of the child, but to the acquired disease in the nurse (The Dis-

In the American Journal of the Medical Sciences for October, 1880, I called attention to the frequency with which the throat is involved in congenital syphilis, and gave a systematic description of the lesions found in the pharyngo-bronchial tract and œsophagus during the course of that disease. In opposition to the then generally received doctrine, I ventured to maintain, as the result of careful investigation of the subject, that, so far from being rare, as was generally supposed, laryngeal affections in congenital syphilis are among the most common and characteristic of its pathological phenomena, and that the invasion of the larynx may be looked for with the same confidence in the congenital as in the acquired form of the disease. Further experience, and the study of cases since recorded by others, have only served to strengthen the positions taken in the paper referred to; for an elaborate discussion of which I must refer to the original, from which also the following account is taken:

The laryngeal lesions of congenital syphilis are constant and characteristic, and play an important *rôle* in the pathological evolution of the disease. Often among the first events of its clinical history they may rapidly terminate in death, or stealthily advance, inducing progressive morbid changes, which, at first controllable and evanescent, may ultimately become inveterate. And thus the laryngeal inflammation may outlive the series of phenomena which mark the progress of the malady, witnessing their inception, course, and disappearance, itself alone rebellious to the approaches of the treatment by which they have been controlled or dissipated.

The larynx may be involved at any, but usually at an early, epoch. Laryngitis may even arise during intra-uterine life. The most common period of invasion, however, is within the first six months after birth. Out of seventy-six cases of laryngitis, fifty-three occurred within the first year; and of these, forty-three within the first six months, seventeen within the first month, and four within the first week of life. Age, therefore, seems to exercise a predisposing influence upon the eruption of the disease in the larynx. This applies not only to the superficial changes, but also to the more malignant forms of laryngeal destruction.

The laryngeal affection is met with more frequently in the female than in the male sex, in the proportion of three to two. It develops at

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eases of Children and their Remedies, by Nicolas Rosen von Rosenstein, translated from the Swedish edition of 1771 by Dr. Andrew Sparrman, p. 332, London, 1776). Long before Colles wrote, Josef Jacob Plenck, in speaking of the signs of inherited syphilis, observes that not infrequently the fauces and labial commissures become exulcerated—a condition indicated by a rough voice, nocturnal cries, sleepless nights, etc. "Non raro fauces et commissuræ labiorum simul eroduntur. Index vox rauca, clamores nocturni, noctes insomnes, deglutitio difficilis, tabes, mors" (Doctrina de morbis venereis, p. 149, Viennæ, 1779). This writer also refers to ulceration of the fauces in "latent" syphilis.

all periods of the year, without regard to season, although it is naturally aggravated by those atmospheric changes that determine catarrhal conditions.

Imperfect nutrition and forced neglect of hygienic laws sufficiently explain its prevalence among the children of the poor.

The classification of the laryngeal lesions of congenital syphilis into secondary and tertiary will not obtain, as in the case of acquired disease. Their pathological evolution is not governed by the same laws that regulate the eruption of syphilis in the adult larynx, nor can we predicate, in any given case, the order in which they will appear. In some, not a few, the deeper destructive forms are the first indication of laryngeal mischief.

In congenital syphilis we may distinguish two principal varieties of laryngeal inflammation. In the one the changes are limited to the mucous membrane, and it may be the submucosa; its march is essentially slow, and there is little tendency to invasion of the deeper structures. The other is characterized by deep ulceration of an extremely acute nature, which, especially in early life, rapidly involves the cartilages and their envelopes, and constitutes the most frightful form of the disease. In addition to these, there is a third form, in which a gradual deposit of dense fibrous material takes place within the tissues of the larynx, and leads to contraction of its lumen.

These pathological facts justify a classification based upon the anatomical seat of inflammation. The laryngeal lesions may accordingly be classified as *superficial*, *deep*, and *interstitial*.

Chronic superficial laryngitis is the condition most frequently met with. It is limited to the mucous membrane and submucosa, is essentially chronic, runs a definite course, gives rise to well-defined changes in the larynx, and may be divided into three stages. The first, or stage of hyperæmia, presents nothing diagnostic; the redness is generally diffuse, but sometimes is confined to special areas. It is commonly associated with congestion of the trachea, coryza, and erythema of the fauces and pharynx. Gradually, however, a condition of hypertrophy is developed in the laryngeal membrane, which becomes swollen, thickened, and infiltrated, constituting the second stage, or that of infiltration and hypertrophy. If the larynx be examined now, its membrane will be seen to be deeply injected, and often slightly translucent from chronic inflammatory œdema. The epiglottis, ventricular bands, and arytenoids have a swollen, rounded appearance, while the vocal cords are thickened and reddened, and their excursive mobility is impaired. Swelling of the mucous glands sometimes occurs, but the secretion is generally scanty. These changes are occasionally limited to one side of the larynx. Thus, one half of the epiglottis, its corresponding aryepiglottic fold and ventricular band, may be swollen and thickened, while the opposite side of the larynx is in a state of simple congestion. If the throat be neglected, minute ulcers form by the liquefaction of the superficial portions of the mucous membrane, which partake at first more of the nature of erosions, but which, in long-standing cases, involve the whole thickness of the membrane and sometimes reach the cartilage. Arrived at this period or stage of ulceration, the affection becomes stubbornly rebellious to treatment. Under antisyphilitic medication the ulcers heal, it is true, and temporary relief is afforded; but sooner or later fresh ones appear in other parts, thickening and hypertrophy become progressive, and secondary changes may be induced in the lungs, either by direct extension through the trachea and bronchi, or as the result of a diminution in the caliber of the larynx itself. As cicatrization of the ulcers takes place, small papillary or polypoid hyperplasiæ arise around the edges of the cicatrix. When small, they impart (post-mortem) to the finger a rough, granular sensation. They are more common in the child than in the adult, and the same may be said of the ulceration which precedes them.

Such is the common history of this form of laryngitis. Commencing in early childhood as an ordinary catarrh, for which it is often mistaken, it gradually but surely asserts its specific nature. To it is due the characteristic cry and other symptoms referable to the larynx, so common in the early stages of congenital syphilis. The changes which have been described require time for their completion, months and even years elapsing before they reach their full development.

From the fact that hoarseness and other laryngeal symptoms sometimes coexisted with mucous patches on the palate and in the pharynx, it was assumed by Diday (Syphilis des nouveaux-nés, New Syd. Trans., pp. 64, 65) that they were due to the presence of similar lesions within the larynx, in the neighborhood of the aryepiglottic folds. Czermak (Der Kehlkopfspiegel, New Syd. Trans., 1861, p. 53) and Türck (Klinik, etc., Wien, 1867, 161te Fall, and Atlas, xxii, 4) have each reported cases where they were seen with the laryngoscope; and one is referred to in the Gazette des Hôpitaux (Gaz. des Hôp., 1860, No. 51, p. 202), in which they were found in front of the arytenoids. The patches described by Czermak and Türck are, however, evidently examples of true ulceration, and the account of the laryngeal appearances in the child from the Hôpital Necker is too meager to be of any value in establishing the existence of mucous patches in the larynx of the congenital syphilitic.

The deep, destructive, ulcerative laryngitis corresponds in physical characters pretty closely to the tertiary inflammation of acquired syphilis. It may follow the superficial form, but generally occurs independently of it. It is sometimes among the first symptoms of infection, and is then most destructive.

As a rule, deep, pharyngeal ulceration precedes or coexists with this form of laryngitis, but deep ulceration of the larynx occurs, too, without the slightest evidence of pre-existing pharyngeal lesions.

Laryngeal ulceration does not commonly follow the pharyngeal destruction of so-called latent syphilis. The palato-pharyngeal ulceration found in tardy congenital syphilis has little tendency to invade the larynx; its future theater of action is the naso-pharynx and nose.

The first stage of this form of laryngitis consists either in a deposit of gummatous material in, or a round cell-infiltration of, the structures which subsequently become the seats of ulceration. The resulting ulcers have the same appearances as those found in the tertiary period of constitutional syphilis, and lead to similar deformity and stenosis. They are single or multiple, symmetrical or confined to one side of the larynx. Their most frequent seat is the epiglottis; they are often situated in the ventricles; less frequently on the upper and under surface of the vocal cords, ventricular bands, aryepiglottic folds, and plica meso-arytenoidea. They are also observed in the subglottic cavity.

There is a remarkable tendency in the laryngeal ulceration of congenital syphilis to destruction of the deeper tissues—the cartilages and their envelopes—and this predisposition is most marked in those in whom the throat is attacked at an early stage of the disease. There seems to be an inherent virulence in the process, which finds in the imperfectly developed laryngeal structures an appropriate field for the display of its destructive power. Chondritis, caries, and necrosis are found in over two thirds of the recorded cases at all ages. Of these, over three fifths occured within the first year of life.

Chronic interstitial laryngitis is intermediate between the two forms of inflammation already described, and is rarer than either; but it is of considerable practical importance in view of its insidious tendency to stenosis. It consists essentially in a gradual deposit of a fibroid material in the tissues of the larynx which leads inevitably to serious interference with respiration. But few cases of this condition have been recorded; it is possible, however, that it may be looked for at a period when other interstitial changes, notably keratitis, commonly develop.

Lesions of the Trachea and Bronchi.—The trachea is the seat, though much less frequently, of the three forms of syphilitic inflammation described as occurring in the larynx. Apart from superficial changes, well-pronounced tracheitis and deep ulceration are relatively rare. The condition most commonly found is congestion, generally streaked or confined to certain areas, with moderate swelling of the mucous membrane. In two cases examined post mortem there were numerous small ulcers confined to the upper third of the trachea. Small granular hyperplasiæ existed in their vicinity. Ulceration and cicatrices have also been observed by Hüttenbrunner (Jahrbuch f. Kinderheilkunde, Bd. v, 1872, p. 338), Woronchin (ibid., Bd. viii, 1875, p. 108), and Sturges (*vide* London Lancet, April 10, 1880, p. 566), and a case of stenosis has been recorded by Steiner (Jahrb. f. Kinderheilkunde, Bd. vii, 1865, ii, § 64).

Symptoms of Congenital Laryngeal Syphilis.— *Voice and Cry.* —The cry in the infant and the voice in the older child exhibit all degrees of phonetic impairment, from slight huskiness to the toneless whisper of absolute aphonia. At first the cry has a shrill, piping tone, that has been compared by West and Zeissl to the sound of a child's toy trumpet. This sometimes degenerates into a peculiar squeak. Soon it assumes a characteristic, vibratory twang, difficult to describe, but not unlike the vocal resonance which is heard just above the level of a pleuritic effusion. This is probably due to the sonorous vibrations of the thickened mucous membrane, which, at a stage when infiltration has not advanced to consolidation, is loose, and admits of being thrown into exaggerated vibration by the current of expired air. Later the voice becomes harsh, cracked, and finally completely lost. It is surprising, however, to what extent the larynx may be involved without impairment of the voice.

Cough is frequently present, and is often a very distressing symptom. It is paroxysmal, suffocative, intermittent, raucous, and frequently followed by vomiting. The impairment of phonetic quality may be of diagnostic value in those cases in which corresponding changes in the voice are absent. The paroxysms may be excited by crying or attempted deglutition, but are generally worse at night, leading to attacks of dyspnœa, which threaten suffocation. There is not much expectoration, except in the deep ulcerative form, when it is very profuse and muco-purulent, filling the larynx and interfering with laryngoscopic examination. The amount of secretion may be taken as an approximate measure of the extent to which the destructive process has advanced.

Respiration is seriously embarrassed, the rhythm hurried, and often interrupted. Attacks of dyspnœa are brought on by coughing and suckling, and are worse at night, leading to orthopnœa, cyanosis, and convulsions. Sometimes the breathing has a *bronchial* sound, and is stridulous and stertorous, according to the amount of obstruction. The respiratory distress is, as a rule, commensurate with the amount of laryngeal stenosis; but secondary changes in the trachea, bronchi, and lungs are sometimes important factors in its production. It is also modified by the degree of nasal obstruction from coryza.

Deglutition is difficult, and sometimes painful and impossible. It is caused by pharyngo-laryngeal swelling and ulceration; but we may assume that in some cases it is due to lesions of the œsophagus itself. Laryngismus occurs quite frequently, and is sometimes the immediate cause of death. In a case reported by Thomas Barlow (Trans. Path. Soc., London, vol. xxviii, 1876–1877, p. 287) it was associated with disease of the meninges of the brain.

In many cases no definite relationship seems to exist between the laryngeal and cutaneous lesions of congenital syphilis. It is also an interesting fact that, while the external lesions yield readily to antisyphilitic medication, the laryngeal often have a tendency to persist. The larynx seems to be the last organ to surrender to therapeutic influence. Among the secondary complications in the lungs are congestion, atelectasis, emphysema, bronchitis, pleurisy, and pneumonia. The latter is often the immediate cause of death. But the condition which commands most serious attention is the sudden and fatal laryngeal œdema, which occurs without warning, and from which the patient often dies before assistance can be obtained.

Diagnosis.—The laryngeal affection in its first stage may be mistaken for simple laryngitis, and when associated with chronic bronchial irritation or pulmonary inflammation may be confounded with tubercular laryngitis. But the greatest difficulty will arise in its discrimination from laryngeal growths. Here, if laryngoscopic examination be impossible, the diagnosis may be involved in doubt.

Rapid cicatrization of laryngeal ulceration under the iodide of potassium practically settles the question of syphilis; but the diagnosis can be made, in the majority of instances, without invoking its aid. When ulceration attacks the deeper structures the action of the iodide may be slow. Here, if nutrition be stimulated by tonic treatment, and especially by cod-liver oil, the processes of repair will be accelerated. But this obviously does not warrant the conclusion that the destruction is not syphilitic. The power of cod-liver oil over the phenomena of congenital syphilis is the same as that which it exercises in other wasting diseases—an influence which is often overlooked. The assumption, therefore, that an ulcer which heals under this drug, either alone or combined with the iodide of potassium, is necessarily scrofulous, diverts the mind from a rational interpretation of the case.

Prognosis will be influenced greatly by the age of the patient; the earlier the throat is attacked the more serious the results. Pharyngo-laryngeal ulceration occurring within the first year is almost invariably fatal. Deep ulceration of the larynx, in view of its destructive tendency, offers a grave prognosis at any period. The prognosis in chronic, superficial laryngitis is more favorable as regards life, though the tendency to laryngeal œdema and spasm should not be lost sight of. This form of laryngeal syphilis is exceedingly persistent and intolerant of treatment. It is often the *primum vivens* and the *ultimum moriens* of the disease. As Vidus Vidius said of syphilis, "it makes many truces, but never peace." In all forms of laryngeal syphilis, death may take place from acute œdema. The prognosis will depend, furthermore, upon the gravity of the general infection and the secondary complication in the lungs.

Treatment.—In acute laryngeal syphilis the treatment should consist in mercurial inunction over the thyroid cartilage, the inhalation of calomel or iodide of zinc in the form of vapor, and the internal administration of potassium iodide. The aggregate daily dose of the latter should be large, and the drug pushed rapidly to the verge of iodism.* Should the dangerous symptoms not yield in forty-eight hours, the question of tracheotomy should be considered.

In the more chronic forms, mercury in tonic doses, combined with iodide of potassium, should be exhibited, the local treatment consisting in the use of topical applications and inhalations. As a topical application to the ulcers, great reliance may be placed upon iodoform, or the vapor of the iodide of zinc may be used.

THE EFFECT OF CERTAIN ACUTE MORBID PROCESSES UPON THE THROAT AFFECTIONS OF SYPHILIS, CONGENITAL AND ACQUIRED.

In a paper read before the American Laryngological Association in 1884 (A Contribution to the Study of Congenital Syphilis, Trans. Am. Laryng. Assoc., 1884, and N. Y. Med. Journ., May 31, 1884), I contributed some observations on the manifestation of congenital syphilis in the throat, and their behavior under the influence of certain acute diseases, from which the following extract is taken.

In the paper on congenital throat syphilis to which reference has already been made in the preceding section (article on Congenital Syphilis of the Larynx), the following conclusions were reached in regard to deep destructive ulceration of the oro-pharyngeal cavities:

1. That deep ulceration may invade the palate, pharynx, and naso-pharynx at any period of life from the first week up to the age of puberty. Thus, of thirty cases analyzed with reference to the period of invasion, fourteen occurred within the first year and ten within the first six months of life, the remainder occurring at periods more or less advanced toward puberty. 2. When the eruption of inherited syphilis is apparently delayed until the latter period, that lesions of the palate and pharynx are found with a peculiar constancy, and often first attract attention to the existence of a diathesis of which they are the sole pathological expression. 3. That females are attacked more frequently than males. Thus, out of sixty-nine cases of pharyngeal ulceration, forty-one occurred in the former sex. 4. That ulceration may occur in any situation, but its most frequent seat is the palate, for which it exhibits the

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* In using large doses of the iodide the physician should at the same time be on the lookout for the œdema of the larynx not infrequently occurring from its administration.

closest elective affinity. 5. That when situated at the posterior portion of the hard palate the tendency is to involve the soft palate and velum, and thence to invade the naso-pharynx and nose; while, situated anteriorly, it seeks a more direct pathway to the latter, which is established by perforation of the bone. 6. That the next most common seats of ulceration in order of frequency are the fauces, naso-pharynx, posterior pharyngeal wall, nasal fossa and septum, tongue, and gums. 7. That ulceration, especially that of the palate, shows a disposition to centrality of position, together with a special tendency to caries and necrosis of the bone—a fact probably explicable by the great vascularity of the periosteum and medullary membrane in youth. 8. That the tendency to necrosis exists at all periods of life, but especially in early youth, when it is more destructive and less amenable to treatment. 9. That while deep pharyngeal ulceration generally precedes or coexists with similar affections of the larynx, the latter occurs, too, without evidence of pre-existing pharyngeal lesions. 10. That simultaneous or consecutive ulceration of the palate, pharynx, and nose seems to be characteristic of syphilis, or at least occurs more frequently in this than in any other disease.

I bring these facts again into prominence because they differ from commonly accepted views, and because they possess at least a certain value by reason of the method by which they were obtained. I desire also to reiterate what was said in connection with the confusion of these lesions with so-called "scrofulous" ulceration. Without entering into a discussion of the subject, suffice it to say that there is no just ground for belief in an ulcerative scrofulide of the throat. It needs only the most superficial review of the writings of those who maintain its separate existence to show the utter confusion which prevails, as the result of erroneous views handed down among the traditions of an obsolete pathology.

It is obviously a point of great practical importance that this fact should be recognized, and especially in view of the rapidly destructive tendency of inherited syphilitic ulceration in the oro-pharyngeal cavities and larynx.

The throat ulceration of congenital syphilis not only exhibits a special tendency to rapid invasion of the deeper tissues; it often possesses an inherent virulence which places it apparently beyond the reach of therapeutic control. This is markedly true of the ulceration which occurs in the earlier years of life. Cases are now and then encountered in which the ulcers stubbornly refuse to cicatrize, or do so sluggishly and imperfectly, healing at one point and becoming simultaneously active at others. *Under such circumstances, when remedial measures are apparently of little or no avail, they sometimes cicatrize, as if by magic, on the acces-*

sion of an acute disease. It is to this that I wish to direct particular attention.

The clinical study of the cases upon the analysis of which the report referred to was based disclosed certain striking facts in connection with the influence of some of the ordinary infectious diseases of childhood upon the progress of the inherited syphilitic affection. From the historical narrative *furnished by this particular group of cases* it would appear (1) *that, while congenital syphilis affords no absolute protection against certain acute infectious diseases, its existence in the individual seems often, other things being equal, to mitigate their severity and exert a favorable influence on their course ;* (2) *that certain acute diseases, accompanied by an exanthem, favor the dissipation, at least temporarily, of the throat and other manifestations of the disease ;* (3) *that while at no period of the disease is the child exempt from these affections, they are more liable to be contracted during the period of latency—that curious interval of apparent health in congenital syphilis which Cazenave has poetically called the sleep of the virus.* These remarks are limited to scarlet fever, measles, and chicken-pox, but they could doubtless be extended to embrace others of the exanthemata.

They do not apply, for obvious reasons, in the case of excessive virulence of the syphilitic cachexia or malignant epidemic influence of the intercurrent disease.

Of special interest is the effect produced by acute febrile disease upon the throat lesions of congenital syphilis. *Chronic inflammatory conditions and ulceration of the larynx, pharynx, and nasal passages are often influenced in a remarkable manner through the presence in the individual of an intercurrent febrile affection. This is, moreover, eminently true of those acute blood diseases with special tendency to local manifestations in the throat, such as scarlet fever, measles, diphtheria, etc. According to personal experience, scarlet fever and measles exert, as a rule, a favorable influence on the course of the throat affection, their supervention being of itself sufficient to cause its complete disappearance. The poisons of the two diseases in their circulation in these regions appear to be mutually destructive, and the throat escapes by virtue of such reciprocal antagonism.** *The cure here may be permanent, or relapses of the inflammatory or ulcerative process may follow the removal of the antagonistic influence of the intercurrent disease.*

These remarks do not apply to diphtheria. When this affection supervenes during the existence of lesions in the throat, the patients rapidly succumb to the disease. The existence of syphilis in the child apparently increases the tendency to membranous formation; indeed, in some instances, apart from the presence of the diphtheritic process, there seems to be a *special tendency to fibrinous formation in the nose and retronasal space.*

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* It is quite possible that this may also be true of other mucous surfaces of the body.

The influence of acute disease upon the manifestations of constitutional syphilis is a subject which has received some attention at the hands of syphilographers, especially certain of the French school; but very little is known as yet, beyond the empirical fact that the lesions of that disease, and especially the cutaneous syphilides, are often modified by the introduction into the blood of the virus of an intercurrent febrile affection. This modification may consist either in the permanent or temporary dissipation of existing syphilitic lesions, or in the exaggeration or intensification of the morbid process. Thus, for example, various syphilitic affections, such as skin eruptions, exostoses, etc., have been observed to disappear during the course of erysipelas (*vide* Cazenave and Schedel, Practical Synopsis of Cutan. Dis., etc., p. 353, Phila., 1829; Rayer, Traité des mal. de la peau, Paris, 1835; Lamarche, De l'Érysipèle salutaire, Thèse de Paris, 1856, and the excellent articles of Mauriac, Étude clinique sur l'influence d'érysipèle dans la syphilis, Paris, 1873; published also in the Gazette des Hôpitaux, nouv. sér., 1873, pp. 305, 321, 346, 385, 410, 443, 466, 506, 546, 569, 594, 601; see also Bidenkap's case, cited by Bäumler, Von Ziemssen's Cyclopædia, Am. ed., vol. iii, p. 98, 1875), acute rheumatism (Rayer, *op. cit.*, p. 546, Mauriac; see also Jourjon, Infl. des mal. aiguës sur quelques manifestations cutan. de la syph., Thèse de Paris, 1870), cholerine (Cazenave, Traité des syphilides, p. 593, Mauriac), variola (Gore, Lancet, September 2, 1858), febrile furunculosis (Diday, quoted by Mauriac, *loc. cit.*), etc. Laségue (Traité des angines, pp. 110–112) has recorded a case of ulceration of the pharynx and tonsils which disappeared during an attack of erysipelas; while in a similar one observed by Martellière (Sur l'angine syphilitique, cited by Mauriac) a fatal result ensued from that disease. The dissipation of syphilitic eruptions has also occurred during pregnancy (Gilbert, Bull. de l'acad. de méd., 1851, tom. xvii, p. 156), and as the result of vaccination (*vide* Revue méd., 1861, tom. i, p. 157, Jeltzinzki); and there is a case on record in which the latter apparently exerted a curative influence in caries of the pharyngeal vault (Jeltzinzki, *loc. cit.*, Sur la cure radicale de la syphilis par la vaccination).

The remarkable power of erysipelas over the cutaneous syphilides has suggested its artificial production as a therapeutic agent in these affections (Sabatier, Propositions sur l'érysipèle considéré principalement comme moyen curatif dans les mal. cutanées, etc., Thèse de Paris, 1831), while their behavior under the operation of the vaccine virus led to the now almost forgotten practice of Lukonski (Jeltzinzki, *loc. cit.*). It has finally even been proposed by an enthusiastic pupil of M. Hardy to inoculate the poison of smallpox in cases of syphilis which have resisted all other methods of treatment (Garrigue, De l'influence des mal. aig. sur les diathèses, Thèse de Paris, 1870).

It is sufficiently evident, then, that a reciprocal antagonism exists between the poison of syphilis and that of a number of acute diseases. By what pathological law this is brought about is, in the present state of our knowledge of the mutual relations of disease, a matter of pure speculation.

This remarkable influence of the febrile state upon syphilitic inflammation and ulceration of the nasal passages and throat is also in a measure true of simple inflammatory conditions of these cavities. It were foreign to the purpose of the present article to elaborate this latter and cognate subject, and I shall therefore simply offer for consideration the fact that *simple catarrhal inflammation of these regions occasionally disappears completely, and is permanently cured during the course of an acute febrile disease.* Whether this occurs as a phenomenon of so-called "substitution," or as the result of a profound impression made upon the nutrition of the parts by virtue of which abnormal secretion is arrested and the inflamed tract placed in a condition favorable to resolution, can only be determined by the accumulation of more exact scientific data concerning the reciprocal antagonism of pathological processes.

Without, then, attempting any special explanation or generalization, I present the foregoing observations from my clinical experience as a contribution to the study of an interesting but imperfectly understood subject.

VISCERAL SYPHILIS.

By W. T. COUNCILMAN, M. D.

GENERAL CONSIDERATION OF THE SUBJECT.

Our exact knowledge of lesions of the viscera due to syphilis is of comparatively recent date. The first description of the anatomical changes leading to the production of the lesions is that given by Gubler, of Paris, in 1847, of the lesions in the liver of congenital syphilis. This was soon followed by the description by Dittrich, of Prague, in 1851, of the lesions of the same organ in the acquired disease. The description of congenital syphilis of the lung by Depaul appeared at about the same time. The first careful study of all the lesions of the viscera due to syphilis, with general considerations of their character, drawn from a comparison of the lesions in the various organs, was made by Virchow, and published in the fifteenth volume of his Archives. In spite of the great number of publications on the subject which have appeared since then, comparatively little has been added to the classical description of Virchow.

Nothing has so added to our knowledge of the anatomical processes of disease as the discovery in recent years of their essential causes. In general we know that the character of the various anatomical lesions in the infectious diseases is due to the specific character of the virus of the disease, the manner in which it enters the tissue, and the anatomical structure and general character of the tissue affected. We know that certain tissues have a much greater resistance to the action of a given virus than others, and that in the same tissue varying lesions may be produced depending on whether the virus reaches it by means of the blood or lymphatics, or by means of ducts communicating with the outside. In a number of infectious diseases we are able to distinguish lesions of two sorts: first, those due to the direct local action of the *specific living organisms* of the disease and always found in connection with these organisms; and, secondly, those which are due to the action of a *chemical substance* or *substances* formed either by the living organisms directly or by the tissues of the body under the action of the organisms. The best example of this is given in diphtheria, in which the local lesions due to the direct action of the bacilli on the tissues are by no means commensurate in importance with the lesions produced by the action of the chemical toxic albumens. We know at present little or nothing concerning the essential cause of syphilis; proof has not been brought forward which would justify us in regarding any of the organisms which have been described in connection with the lesions as causative. It is probable that when the cause of the disease has been discovered a light equal to that thrown on tuberculosis by the discovery of the tubercle bacillus will be shed on the disease. We are justified, however, in extending to syphilis analogies drawn from our knowledge of other infectious diseases.

In syphilis we must distinguish lesions of varied character, the variations depending largely upon the time which elapses between their appearance and the initial lesion of the disease. They have been in this way divided into the primary, the secondary, and the tertiary lesions. In the first place, closely following the initial lesions, we find lesions of the lymph glands in the immediate vicinity, followed by more or less involvement of the lymph glands in distant parts. There then takes place a period of latency, lasting six or seven weeks from the date of the initial lesion, which is followed by lesions of the skin and mucous membranes. It is probable that these lesions are due to the action of a definite *contagium vivum*, which, in the first place, starting from the initial lesions, reaches the lymph glands, and after a variable time enters the circulation, producing lesions in the skin and mucous membranes. From the character of these lesions and their extent we must believe that the infectious agent could only reach the parts affected by means of the blood circulation. At this time lesions of the viscera are but little apparent, but it is probable that they take place. Little opportunity has been given for their study by the rarity with which death takes place in these earlier stages, and up to the present no careful anatomical study of the viscera has been made in the early stages of syphilis. The evidence that they do take place is shown in the albuminuria which often appears during the time of the skin eruptions, and slight jaundice. These lesions are temporary. They subside with the subsidence of the lesions of the skin and mucous membranes, and they probably consist in very slight parenchymatous degenerations. They are probably due to the action of chemical substances which have no specific characters and are produced by the lesions. In the great majority of cases the disease ceases with these secondary lesions. The percentage of cases in which the tertiary lesions, which include the essential syphilitic lesions of the viscera, appear, differs with different authors. Profeta gives their frequency at 5 per cent of the cases, Diday as 10 to 12 per cent, Rollet as 5 per cent, Haslund as 9 to 10 per cent, Mauriac as 10 to 15 per cent. This refers to cases which have undergone more or less antisyphilitic treatment. In cases which have not undergone any treatment Sigmund gives their number as 30 to 40 per cent. These figures, however, derived exclusively from clinical observations, do not give any definite information as to the frequency of late lesions, for they only refer to cases in which the lesions have been sufficiently extensive to give rise to symptoms, and we know that in any disease it is difficult to exclude lesions by the absence of symptoms. Still, it is probable that tertiary and visceral lesions do not necessarily play a part in the disease.

After the secondary lesions there is a period of latency lasting a variable time. Its average duration is from five to seven years, but cases have been known in which as many as fifty years have elapsed between the secondary and the appearance of the tertiary lesions. After this period of quiescence a new set of lesions, which differ in character from the earlier lesions, make their appearance. The most marked difference which distinguishes them from the earlier lesions is that they are not infectious. In the earlier stages the disease may be reproduced by inoculation either with the products of the disease or with the blood. In the late stages, in which the lesions are more marked in the viscera than elsewhere, and in which we have essentially the period of visceral syphilis, neither inoculation with the lesions of the disease nor the blood or secretions of the individual are capable of in any way reproducing the disease.

One quality of syphilis which especially distinguishes it from the great body of infectious diseases is its transmission by inheritance. In the earlier stages of the disease it can be transmitted to the offspring either by the father or the mother. The lesions of the fœtus are always much more extensive when the mother is the source of the disease than when it is derived from the father. If the infection of the mother takes place in the earlier months of pregnancy, the child is usually affected; but if the infection of the mother takes place in the last months of pregnancy, and the child is born before the disease has reached the stage of general infection in the mother, the child is not affected. It is probable that the ovum can be infected at the time of conception by the father without any infection of the mother at the same time, but on this point there is still some doubt. The lesions in congenital syphilis may partake of the character of the lesions of both the early and late periods of the acquired disease. They differ from the acquired in that both sorts of lesions may appear together, or lesions corresponding to the tertiary lesions in acquired syphilis may be the only evidence of the disease. In general we know that the lesions in the congenital disease are infectious, but no attempt has been made to separate the lesions into those which are infectious and those which are not. The most common manner in which infection from the fœtus takes place is by nursing, and the lesions of the mucous membranes of the mouth, which correspond to the secondary lesions in acquired syphilis, are the source of infection. No inoculations have been made from the lesions corresponding to the noninfectious tertiary lesions of acquired syphilis with a view of determining their infectiousness.

Finger was the first to advance the idea that later visceral lesions are due to the action of a chemical substance which he regarded as a ptomaine formed by the living organisms. From our knowledge of the other infectious diseases, and particularly of diphtheria, it would seem probable that it is not a ptomaine, but a toxic albuminous substance. The best proof that it is a chemical substance lies in the fact that the lesions are not infectious, and that similar lesions may be produced in the fœtus without any preceding lesions; the lesions being due in this case to the action of the chemical substance in the blood of the mother on the tissues of the fœtus. When both sets of lesions are found in the fœtus it is possible that we have to do with an infection of the fœtus, *plus* the action of chemical poison in the blood of the mother, or the poison may be produced from the fœtus itself. It is difficult to explain the period of latency between the early and the late visceral syphilis. We know that the lesions are of very slow growth, and it is possible that the period of latency is only an apparent one, the lesions going on all the time and gradually becoming of sufficient importance to give rise to symptoms. There are other possibilities. The chemical substance itself may undergo a gradual increase in the blood, and only after a long time reach sufficient amount or acquire sufficient virulence to affect the tissues. Or there may be formed in the blood an antidote which in a certain number of cases inhibits the action of the poison altogether, or in other cases it is gradually overcome. Virchow believes that the causative agent is always present in the body, and its action is only manifested by the creation of places of lowered resistance of the tissues, whether by trauma or in some other way. If this be the case, it is difficult to explain the period of latency, for why should not foci of lowered resistance be formed at any period of the disease?

Syphilis produces lesions in the viscera of two sorts, generally combined with one another. There are diffuse lesions, characterized by diffuse parenchymatous degenerations with formation of connective tissue; and circumscribed lesions, which take the form of gummata. Along with these lesions the vessels are frequently affected. We recognize as the most frequent and in all cases the most serious affection of the vessels, amyloid infiltration. We also have hyaline degeneration and inflammation of the walls of the vessels, leading to disturbances in the circulation. The lesions take place slowly. The connective tissue is of slow formation, and often approaches cicatricial tissue in its density and poverty in cells. Accompanying this there is frequently infiltration with round cells, pointing to a more rapid advance.

The chemical substance may act in producing the lesions in a number of ways. It may act directly on the cells of the tissue, producing degenerations which are followed by connective-tissue growth, or it may produce primary lesions in the vessels followed by degeneration. These are its two most probable actions, but we can not exclude the possibility that it may act directly on the connective tissue, exciting this to hyperplasia.

A most important difference is shown in the chemical reaction of the lesions at the different periods, as shown by the effect of treatment. While mercury may be regarded as a true remedy in the earlier lesions, iodide of potassium is equally efficacious in the later visceral lesions.

I. SYPHILIS OF THE PLACENTA.

Among the visceral lesions produced by syphilis, those of the placenta are of the first importance. The placenta, forming as it does the union between the mother and the child, we should expect that many of the questions relative to the nature of the syphilitic virus would be cleared up by a careful study of the lesions produced in it. The placenta, however, up to the present has not received the careful study which its importance merits, and no study which has been made of the syphilitic lesions in it has had in view the clearing up of the general question of the transference of a disease from the mother to the offspring, but the authors have contented themselves with a bare and generally superficial description of the lesions. In all the diseases which can be studied experimentally, and in which the fœtus can acquire the disease from the mother, the specific organism of the disease makes its way into the blood of the fœtus by first producing lesions of the placenta. Syphilis would seem to be an exception to the general rule, in that in some cases of inherited syphilis no lesions of the placenta have been made out. It is very probable, if we assume the lesions of the late stages to be due to a chemical substance formed in the body, that such a chemical substance might pass directly from the maternal to the fœtal blood without the production of placental lesions. The cases, however, in which the fœtus is born with infective lesions would not admit of such an explanation, for in these lesions we have no analogy in other diseases which would justify us in believing that they can be due to any other than a living organism. If the fact, so generally believed in, that syphilis can be transferred to the ovum at the time of conception by a syphilitic father without any infection of the mother at the same time, could be regarded as definitely proved, that would also be without any analogy. We should have to assume in such a case that the spermatazoön could carry to the ovum the living disease germ, and that this should grow in the developing embryo. It is probable that the distinction which has been insisted on by most authors who have written on the subject, between the lesions of the fœtal part of the placenta when the disease comes from the father and the fœtus is primarily affected, and the maternal part of the organ when the disease of the fœtus is secondary to disease of the mother, will not admit of clear proof. The whole question of placental and congenital syphilis is one in which the most careful and exact study is needed, and there is either a lack of material for its study by pathological anatomists, or they are shy in venturing into a field in which there are so many obstacles to be overcome.

Astruc was the first who called attention to the connection between syphilis and repeated abortions. He sought the cause of the abortion in disease of the fœtus, and paid little or no attention to the condition of the placenta in these cases. Murat called attention to the fact that pregnant women who had suffered for a long time from constitutional syphilis were predisposed to disease of the placenta. He described in these cases a thickening of the placenta, and says the tissue is frequently covered with extravasated blood or shows dark patches. Afterward Dubois showed that these hæmorrhages are also seen in cases where there was no syphilis either of parents or of the child, and the death of the fœtus, which is due to this hæmorrhage in the parenchyma of the placenta, can be more easily explained by the interference with the placental respiration than by a syphilitic infection. Even in the investigations of D'Outrepont, who first showed that disease of the placenta not only produced difficulty and danger in birth, but also had a marked influence on the course of the pregnancy, on the life and nutrition of the fœtus, and must be regarded as a certain cause of disease and the intra-uterine death of the child, no mention is made of placental syphilis. Simpson, in his well-known article on the death of the fœtus in consequence of disease of the placenta, passes over entirely the syphilitic disease of the placenta. Lebert investigated two placentas from mothers with secondary syphilis, and found between the layers of the amnion yellow granulations of tubercular appearance in which were microscopic nodules, similar to tubercles. He did not believe, however, that this should be regarded as a specific alteration of the syphilitic placenta.

As on the literature of syphilis generally, so on this subject also, the investigations of Virchow may be regarded as forming the beginning of our exact knowledge. Virchow was the first who attempted to separate the diseases of the maternal from those of the fœtal portion of the membranes; he says that it is questionable whether the fœtal portions may be primarily affected. Although there are certain cases of hyperplasia and fatty degeneration of the villi of the chorion in very early abortions, he thinks the changes in the fœtal portion of the placenta are most often secondary, and that the essential disturbance lies in the maternal portion.

He describes a peculiar hyperplasia of the decidua marked by polypoid excrescences. Further investigation by other authors showed that this lesion could not be regarded as a specific syphilitic lesion, and was probably due to a simple irritation of the uterine mucosa. He also describes a definite form of endometritis placentaris, which he regards as gummatous. The case in which this was seen came from an abortion during the later months of pregnancy, and from a person suffering from constitutional syphilis. The placenta, which in general was well developed, on the maternal side was surrounded by a somewhat thicker and firmer layer of decidua, in which in several places hard nodules projected in wedge-shaped masses into the tissue of the placental cotyledons. In these nodules he was able to distinguish a whitish fibrous border and capsule, with a softer and more yellow mass in the center. The microscopic investigation of this showed firm connective tissue with large cells, in which here and there were foci of small-celled infiltrations which had in part undergone fatty degeneration. Barensprung, in his work on hereditary syphilis, pays little attention to the question of placental syphilis.

The work of Oedmansson is of importance, although his investigations have not been confirmed by late authors. He found in five out of seventeen cases in which he examined the placenta of syphilitic women, alterations of the vessels of the umbilical cord. This consisted in an advanced atheromatous process of the wall of the vessels with thickening of the intima. In fully advanced cases the intima consists almost exclusively of a case of calcified plates, which were only lightly connected with the vascular wall. Besides this there was more or less thrombosis of the vessels, as well as pathological alterations of the placenta itself. The placental alterations appeared under the form of a more or less advanced interstitial placentitis, whose beginning was found in the disease of the vessels. In other cases there was a focal sclerosis of the placenta with hyperplasia of the villi. The villi appeared pressed against one another, and both the epithelium and the vessels were granular and degenerated. Oedmansson has the idea that many cases of intra-uterine death of the fœtus in syphilis of the parents are due to these changes. Charpentier describes a case in which the placenta of a syphilitic woman who had three times aborted in the eighth month was pale, soft, and fatty degenerated.

There has been scarcely any alteration of the placenta which has not been described as characteristic of syphilis. The classical work of Fränkel on this subject has to a large extent cleared up the confusion, and his work is not only the most important one on the subject, but is one to which further investigations have added little or nothing. Fränkel investigated more than one hundred placentas, coming from both syphilitic and normal mothers. Diagnosis of syphilis of the fœtus was made by the changes in the bones, which Wegner had shortly before described. Fränkel was able to separate, by the differing nature of the lesions, the cases in which the fœtus was infected from the father from the cases in which the infection came from the mother. In the first case he found a marked affection of the villi of the chorion. This consisted essentially in a hyperplasia of the cells of the villi with compression, and in some cases complete destruction, of the vessels within. In addition to this there was frequently marked hyperplasia of the epithelium of the villi. In place of the soft, myxomatous tissue surrounding the vessels with its few stellate cells, there was a comparatively hard and dense tissue, with large numbers of spindle-cells, and between them a relatively dense connective tissue. The villi were thickened and frequently grown together, and in consequence of this condition the vessels were compressed and obliterated (Fig. 1); the blood-space into which the villi entered become more and more filled up by the thickened mass of villi, and in the highest grade of the affec-

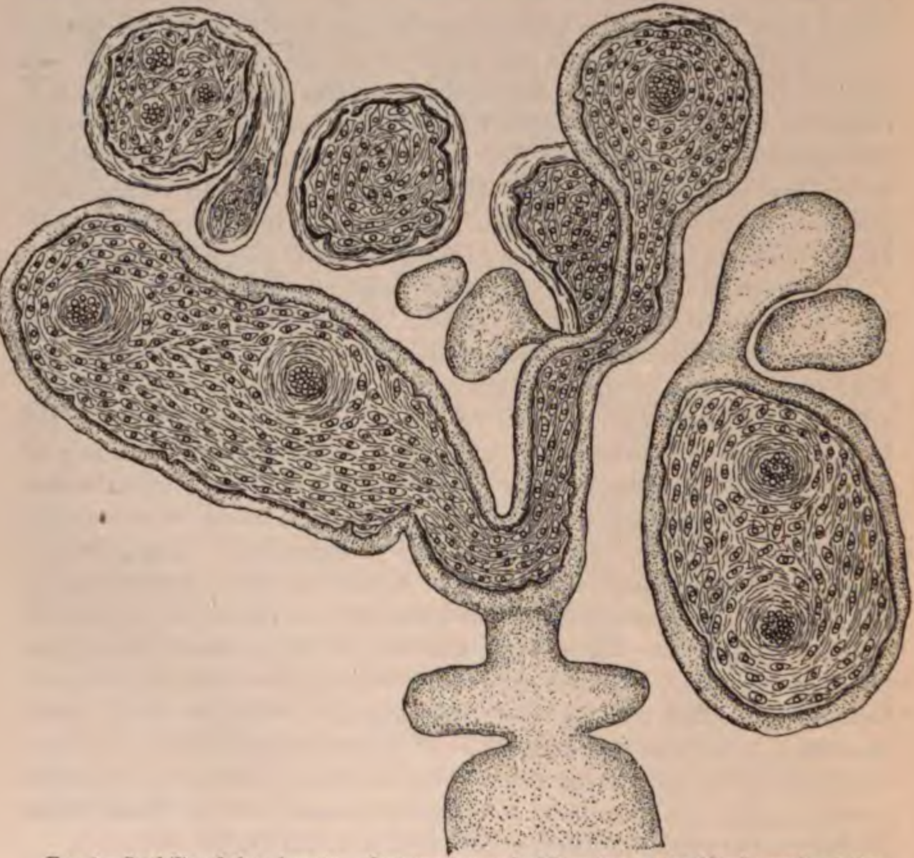

FIG. 1.—Syphilis of the placenta. Compression and obliteration of the blood-vessels of the villi of the chorion by the growth of œdematous tissue.

tion entirely obliterated by this mass. The interchange between the maternal and fœtal blood is more and more inhibited, and finally totally destroyed. Cells of the stroma and epithelium become filled with fatty granulations, and finally undergo fatty degeneration. If the process extends over the entire placenta the fœtus always dies; if only circumscribed foci are formed, the fœtus can remain living and relatively sound. In between the foci there is a marked congestion, the vessels are ectatic and filled by blood extravasations, showing various metamorphoses. Frequently along with this general hyperæmia there is also a formation of connective tissue. He has only found once the thickening and atheroma of the intima of the umbilical vessels which were described by Oedmansson. The development of this placental disease appears to take place in the later months of pregnancy and after the affection of the visceral organs of the fœtus. The earliest period in which it appeared was the beginning of the sixth month; it was found several times in very slight extent and in circumscribed foci. The vessels in the villi were very little changed, and apparently the degeneration only beginning, while the accompanying syphilitic osteochondritis was in an advanced stage and must have existed for a considerable time.

Although this disease of the placenta must exert a marked deleterious influence on the life and well-being of the fœtus, it is so often accompanied by extensive lesions of the fœtus that it is difficult to say whether the death and abortion are due to it. The slighter and focal diseases of the placenta are probably of less importance for the life of the fœtus.

The macroscopic lesions of the placenta consist in a marked hypertrophy either of the entire organ or confined to certain of the cotyledons. The organ is heavier and firmer than normal, and in one case, in which the mother alone was affected, there was a marked gummatous affection of the placenta, and the child, which was carried to full term, was very atrophic, and showed general induration of the lungs, liver, and spleen. The increase in size of the placenta in this case was marked; the convex surface was covered with fresh blood coagula, and almost overgrown by the thickened and cloudy maternal placenta. The lobulation was destroyed. On the surface around the uterus there were grayish-yellow nodules, which extended into the fœtal placenta but did not reach its concave surface. The extension of these nodules into the normal tissue was a radiate one, processes of the connective-tissue and small cell infiltration extending into the normal placental tissue. The nodules consisted of a fibrous whitish-gray periphery and a softer yellowish center.

The microscopic investigation showed the decidua only slightly fatty degenerated, with a hyperplasia of the large deciduous cells. The nodules consisted for the most part of dense connective tissue with numerous foci of granulation cells. The denser central mass consisted of a granular detritus. The villi in the neighborhood of the nodules were more or less compressed; most of them were atrophic, their vessels degenerated, and either fatty or calcified. In several cases in which there was an infection of the mother in the last months of pregnancy there was no affection of the placenta, and the child was healthy.

As a result of his work, Fränkel gives the following conclusions: (*a*) There is a syphilitic disease of the placenta with characteristic lesions. (*b*) The placental syphilis is only found with congenital syphilis of the fœtus. (*c*) The seat of the disease is different according to whether the mother is healthy, syphilis being conveyed by the father, or whether the mother also is diseased. In the first case the placenta is affected along with the fœtus; the affection consists in the definite growth of cellular granulation tissue, with resulting obliteration and destruction of the vessels of the villi, often complicated by a marked thickening of the epithelium. (*d*) In the second case, when the mother is syphilitic, there are other possibilities. In the first case the mother is affected in conception along with the fœtus; there is then syphilitic disease of the fœtal portion of the placenta, often with the involvement of the maternal portion. Or, in case the mother is affected later, then the placenta can either remain normal or become affected, and, when affected, the affection takes the form of gummatous placental endometritis; when the infection of the mother takes place in the seventh month of pregnancy there is usually immunity of both the fœtus and the placenta.

II. SYPHILIS OF THE HEART AND BLOOD-VESSELS.

SYPHILIS OF THE PERICARDIUM.

Syphilis of the pericardium is very rare. There have been numerous cases reported of fibrous pericarditis in syphilitic subjects, but the disease is not more common in syphilitics. In syphilitic pericarditis the lesions must be of such a nature that we can recognize their syphilitic character. Orth has described such a case in a syphilitic child, in which gummatous masses were imbedded in the fibrous tissue uniting the two pericardia. Lancereaux has described a similar case. Such a condition is only of interest anatomically. Chiari has reported a case of pericarditis due to the perforation of a syphilitic ulcer of the trachea into the pericardium.

SYPHILIS OF THE HEART.

The same confusion which we have found in the lungs prevails regarding the nature and the frequency of syphilitic lesions of the heart and arteries. The reason of this is obvious: There are not only lesions which are due to the probable local action of the syphilitic virus, but there are other lesions more diffuse in character, which must be regarded as due to the influence of the syphilitic cachexia, and possibly due to the action of a soluble chemical substance present in the blood: to the first belong the gummatous lesions of syphilis as found in the heart and in the periarterial gummata; to the second, the lesions of fibrous myocarditis, arterial sclerosis, and the endarteritis of the smaller arteries. The confusion arises in reference to the lesions in the second category. While there can be no doubt of the causative influence of syphilis in these arterial affections, still it is only one of many causes all acting in the same way, and the lesions of the large arteries in syphilitics do not differ in any way, either in structure or in their clinical course, from the same lesions produced by other causes. The only way in which we can recognize the causal relation of syphilis to arterio-sclerosis is by the frequency with which we find them associated. The difficulty is further increased by the frequency with which other conditions recognized as in themselves causative are associated with syphilis. These other conditions are the immoderate use of alcohol and excessive muscular exertion. Especially in the negro, in whom arterio-sclerosis seems to be especially common, Bacchus, Vulcan, and Venus are frequently associated together. Fibrous myocarditis, which many authors are inclined to consider as largely due to syphilis, is now regarded as due always to an obliterating endarteritis of the coronary arteries, and this may be due to syphilis or to other causes.

Gummata of the Heart.—The first definite case reported of this is that by Ricord, quoted by Virchow. Ricord found in a man who had had repeated chancres, and later syphilitic tubercles of the skin, and who died suddenly, the heart hypertrophied, and the endocardium of the right ventricle more than one millimetre thick, of a cloudy-white color, and very firm. In the apex of the left ventricle the endocardium was covered with an adherent thrombus, and beneath this there was a hæmorrhagic infiltration of the entire thickness of the heart, with thickening of the pericardium. In several places in the ventricular wall there were small, circumscribed, hard, nonvascular, yellowish masses; some of these had softened in the center, and seemed similar to the syphilitic tubercles of the skin and subcutaneous tissues. The muscular fibers were not pushed aside by the growth, but had degenerated. Lebert also reports a case in which, in a syphilitic woman, there were two round tumors in the right ventricle just beneath the pulmonary valve. These tumors were elastic, of a pale or reddish-yellow color, and on section found to be infiltrated with a small amount of cloudy fluid. Virchow himself reports a very interesting case. In this the heart was greatly hypertrophied and dilated; there was extensive fibrous myocarditis, and associated with this a formation of small, hard gummata.

The gummata may appear in any part of the heart, but they are most often found in the interventricular septum. They are often of a considerable size, and may reach that of a pigeon's egg. In congenital syphilis in stillborn children miliary gummata have been described. They are usually in the form of small, hard, yellowish or whitish nodules of somewhat irregular contour, with a definite capsule of transparent connective tissue, from which a less firm and dense connective tissue extends. On microscopic examination the central mass is composed of sclerosed necrotic connective tissue in which there are no vessels. The muscular substance is completely replaced at the seat of disease by the fibrous tissue. The muscular fibers undergo hyaline and fatty degeneration, and finally completely atrophy and disappear. The connective tissue generally contains but few cells. In the more recent gummata the center is not so hard and dry and the encapsulation is not so complete. The surrounding connective tissue is more cellular. In certain cases there may be a more diffuse gummatous inflammation. In one of our cases of lung syphilis death was due to rupture of the chordæ tendineæ. There was acute inflammation of the mitral valve with ulceration and fibrinous exudation. The chordæ were thickened, and of an opaque white color. On microscopic examination almost all the chordæ showed extensive necrotic and hyaline changes with absence of acute inflammation.

All authors describe along with gummatous myocarditis a fibrous form also due to syphilis. All forms of fibrous myocarditis are probably due to disease of the coronary arteries supplying the part of the heart affected. With the diminution or complete cessation of the blood supply by the narrowing or complete closure of the arteries various forms of degeneration are produced in the muscular fibers, and they are replaced by fibrous tissues. Something may be told in these cases from the character of the arterial lesions. In the absence of general arteriosclerosis of the large arteries, and with a well-marked evidence of syphilis in other organs, we may with some certainty ascribe these lesions to syphilis. When associated with gummata there is no doubt as to their etiology. All parts of the heart may be affected, but there are certain places of preference. The papillary muscles and their insertions are the most frequent seat, and after this the interventricular septum. In 326 autopsies at the Johns Hopkins Hospital there have been 21 cases in which syphilitic lesions were found; of these there were six cases of fibrous myocarditis. In 98 cases of acquired syphilis, Chiari has only found one case of gummatous myocarditis.

There have been cases described in which the lesions were limited to the endocardium. It is very difficult to say how many of these should be ascribed to syphilis. Lang describes a syphilitic valvular endocarditis in which papillary, condylomatous, grayish-white nodules are distributed along the edges of the valves. These nodules consist of vascular connective tissue, with numerous round cells and hæmatoidin pigment. They arise from the subendothelial tissue of the heart. The parietal syphilitic endocarditis ordinarily takes the form of fibrous and sclerotic thickening of the endocardium. In some cases the endocardium is converted into a layer of dense, grayish-white, almost cartilaginous connective tissue, which may be several millimetres thick. Thrombi are often deposited on the surface. The chordæ may be the seat of the affection, and they are then thickened and shortened. Lang has collected nine cases from the literature. One of these cases was that of a stillborn child with congenital syphilis. An interesting case is that reported by Baumgarten. In this, that of a man of twenty-eight years old, along with syphilis of the cerebral arteries there was a soft, smooth, round excrescence on the left flap of the mitral valve. Microscopically the nodule represented a simple connective tissue hypertrophy, with numerous spindle and round cells. In places many of these cells had undergone fatty degeneration.

Heart Aneurism.—One of the most serious conditions which may result from these affections of the heart is the heart aneurism. In twenty-seven of the cases of syphilitic myocarditis, mostly of the gummatous form, which Lang has reported, aneurism was found in three. Dandridge has reported an interesting case. In this, a negress about thirty, with clear syphilitic history and anatomical evidence of the disease, there was a saccular projection at the apex of the left ventricle. The wall was very thin, and at the most prominent place there was a small opening leading into the cavity of the left ventricle. The outer wall of the sac was formed by an indurated mass, which was separated from the surrounding myocardium, and on section was composed of a dark-red substance in which there were clear lines. The rest of the sac was so thin that the sound introduced into its cavity seemed just beneath the pericardium. In one of our cases there was an interesting condition. In this, a negress about twenty-four, with syphilitic stricture of rectum and history of syphilis, the heart was greatly hypertrophied and dilated; the valves all normal, but dilated. One half of the ring to which the mitral valves were attached was greatly thickened and fibrous. The half of the posterior segment of the mitral valve, corresponding to the thickened part of the ring, was thickened near its attachment and formed part of the wall of a circumscribed aneurismal dilatation which was seventeen millimetres in diameter. It was situated in the upper margin of the wall of the left ventricle, close to the junction with the left auricle, and abutted against the anterior half of the posterior segment of the mitral leaflet near its attachment to the ring. The aneurismal sac was lined with thickened, opaque endocardium, and was free from thrombi. The entire anterior and left part of the wall of the left ventricle, for a distance of four centimetres below the aortic valves, was the seat of aneurism formation, which also involved part of the septum. The aneurism was formed by three irregular sacs separated by projecting tubercular ridges. They were completely filled with thrombi, and on scraping these away the wall was found to be composed of white fibrous tissue. In most places where this was present all trace of the muscle had disappeared. In the coronary arteries there was an extensive obliterating endarteritis, and the branch of the artery going to the main aneurismal sac was completely obliterated. The case of Dandridge was an example of an aneurism from softening of a gumma, and our case was due to the dilatation of extensive areas of fibrous myocarditis which resulted from the obliterating endarteritis of the coronary arteries.

Symptoms.—From what has been said of the pathological anatomy it may readily be seen that these lesions can not well be productive of definite symptoms. Fournier, in his work, La syphilis étudiée particulièrement chez la femme, has described cardiac disorders coming on in the second stage of syphilis. These consist chiefly of palpitation, præcordial distress, and dyspnœa. These should not be attributed to any specific influence on the heart, but are due rather to the anæmia which is often a principal feature of the cachexia. Rosenfeld has described a peculiar form of asthma which he has observed in ten cases of syphilitic disease of the heart. He thinks that this differs from the ordinary cardiac asthma, and proposed the name *syphilitic asthma* to distinguish it. He considers as characteristic of the affection that the attacks come on at time of complete quiet, especially during sleep and in the evening and early hours of the night. In this he compares it to the nightly pains in the bones. As Rosenfeld himself says, these phenomena are not sufficient of themselves to diagnose syphilitic asthma. Cardiac asthma also appears during perfect repose and at night, while the syphilitic may appear during the day. Lang gives a case which was unfortunately not confirmed by autopsy, in which asthmatic attacks of great severity occurring at night formed a prominent symptom. Aphasia has also been observed in cases of cardiac syphilis, but this most probably should be attributed to syphilis of the cerebral arteries in connection with the cardiac syphilis. Some of the cases of cardiac syphilis do not produce any marked symptoms during life, and the disease is only found accidentally at the autopsy. Many of the cases die suddenly. The lesions of the heart, both the aneurisms and the fibrous myocarditis occurring in connection with disease of the coronary arteries, are such that sudden death must be a common termination. Death was sudden in two thirds of the cases reported by Grenouiller.

SYPHILIS OF THE BLOOD-VESSELS.

The lesions of the blood-vessels which have been referred to syphilis are (1) general diffuse arterio-sclerosis; (2) nodular arterio-sclerosis; (3)

obliterating endarteritis of the small arteries; (4) hyaline degeneration of the arterial wall; (5) amyloid infiltration; (6) gummatous endarteritis and periarteritis; (7) aneurism.

Arterio-Sclerosis.—With regard to the first and second, while there is no doubt that syphilis plays a very important *rôle* in its production, it is difficult in most cases to separate the action of syphilis from other causes acting in the same way and at the same time. The disease is a general one, and is primarily due to a degeneration of the muscular wall of the vessel. The muscular tissue undergoes fatty and in most cases hyaline degeneration. The artery undergoes dilatation at this point, and there takes place a growth of the intima to compensate for the dilatation and reduces the artery to a normal caliber. The new tissue of the intima is prone to undergo degeneration, and from this the atheromatous condition proceeds. In most cases the best examples of the disease are found in muscular, well-nourished individuals between the ages of thirty-five and fifty. At the Johns Hopkins Hospital, in the last three years there have been at autopsy fifty cases of arterio-sclerosis. In most of these death was due to some other cause. During the same time, in twenty-one autopsies some manifestation of syphilis was found at the autopsy. The diagnosis of syphilis was made on the various conditions found, but especially on the condition of the testicles. All cases in which diffuse interstitial orchitis was found, even in the absence of cicatrices on the penis and all internal evidence of the disease, were put down as syphilitic. Of these twenty-one cases, nine were free from arterio-sclerosis in any form.

There is a general inclination to regard aneurism as due in large part to syphilis. This is only true in the relation of syphilis to arterio-sclerosis. We must regard arterio-sclerosis as the most common cause of aneurism. Aneurism is either due to a general dilatation of the artery producing the cylindrical form, or to rupture of the wall of the artery at some point. Thoma has shown that it is most common in the beginning of the arterial disease, when the degeneration of the media is not compensated by the thickening of the intima. It is also at this stage, when the individual is capable of severe and sudden muscular exertions and in other ways suddenly raising the blood pressure, that such injuries of the internal walls are most apt to be produced. So far as we know, there exist no extensive and accurate statistics showing the relations between syphilis and these diseases of the arteries. Our statistics refer to such small numbers of cases that they are of little value. We have had at autopsy in the last three years twelve cases of aneurism, eleven arterial, and one cardiac. In eight out of the eleven cases, arterio-sclerosis, often of only slight degree, was found. In the one case of heart aneurism, and in two of the cases of vascular aneurism, there was syphilis. There was nothing in the condition of the arteries and in the affection generally, in the cases in which syphilis was found, to distinguish these from the others. Virchow expresses himself very cautiously about the relation between arterial disease and syphilis. He says there is a strong tendency to regard these lesions as syphilitic on account of their similarity to other syphilitic lesions. Peter, in his work, Maladies du cœur et de la crosse de l'aorte, compares the lesions to the syphilitic lesions of the skin. The resemblance is only an apparent one, and is not shown by a close microscopical study of the lesions. The so-called therapeutic test, the favorable influence that iodide of potassium frequently exerts on aneurisms, is to some extent responsible for the idea of the etiology of syphilis in its formation. We have elsewhere alluded to the fallacy of this so-called test.

Endarteritis.—There is much more reason to connect disease of the smaller arteries with syphilis. The first article in which an attempt was made to connect a typical vascular lesion with syphilis was by Heubner in his syphilitic endarteritis. According to Heubner, there is a disease of the arteries found in syphilitic individuals which in many respects differs from the ordinary arterio-sclerosis. The affection is due to the action of the specific agent of the disease on the endothelium of the vessels, producing proliferation of the endothelial cells. This endothelial growth undergoes peculiar changes which often lead to the formation of one and in some cases several new coats inside of the old lumen. The infectious agent, which at first only acted on the intima, gradually affects all the outer coats. The nutrient vessels of the artery are also affected, and finally a true inflammation of the adventitia is set up, from which a tissue similar to syphilitic granulation tissue is produced. This granulation tissue, which forms part of the early stage of the process, and is found both without and within the intima and the adventitia, becomes gradually transformed into connective tissue. The process, according to Heubner, differs from arterio-sclerosis in representing a true new formation of tissue, while in arterio-sclerosis there is only hyperplasia. To the naked eye the difference is easily seen, because in arterio-sclerosis the walls of the cerebral arteries are thickened and dilated either over considerable distances or in foci. It never leads to obliteration or narrowing of the caliber, which is the condition ordinarily found in syphilitic endarteritis. These views of Heubner at first found general confirmation. The disease which he had first described in the cerebral arteries was found in the coronary arteries of the heart, in the retinal arteries, in the umbilical arteries of syphilitic fœtuses, and in various other places. In 1876, two years after Heubner's description, Friedländer described, under the general name of *arteritis obliterans* an arterial disease which was characterized by no specific anatomical characters which could be referred to syphilis, nor could any etiological relation with syphilis be made out.

The whole question of endarteritis has had new light shed on it by the work of Thoma, particularly by his conception of the compensating endarteritis. He has brought out the general law that the caliber of an artery is always in exact ratio to the sum of the capillaries; and when for any reason a portion of its capillaries are destroyed, the caliber of the artery is narrowed by a growth of the intima and the normal relations restored. There is no doubt that much of the arterial disease which is found in the neighborhood of syphilitic affections should be referred to this compensating endarteritis.

But, apart from this, there is no doubt that syphilis does play a considerable part in the production of endarteritis of the small arteries often limited to a particular part of the body. It is probably more frequently found in the brain arteries than elsewhere. The only respect in which it differs from the ordinary form of arterio-sclerosis of the small arteries is in the extent of the growth of the intima, which often leads to complete obliteration. We find in this, as in the ordinary form of arterio-sclerosis, a primary degeneration of the muscular coat. There is no tendency to atheromatous degeneration of the new tissue of the intima. Ir a well-marked case of it which we saw in a man of twenty-seven, who had a severe chancre and slight secondary symptoms four years before, all the arteries at the base of the brain were affected, some of them entirely closed. There were large areas of softening of the cortex corresponding to the distribution of the arteries most affected.

Gummatous Periarteritis.—Baumgarten has described an affection of the cerebral arteries which he regards as peculiar to syphilis. This is a gummatous periarteritis. In this there are gummata in the adventitia of the arteries frequently involving the media. At the seat of the gumma there is usually a dilatation and a growth of the intima compensating for this. The gummata may be distinctly circumscribed, or there may be a gummatous formation, with numerous points of necrosis, extending for some distance along the vessels. The affection extends from the arteries to the neighboring meninges. Thomas has lately described a case of this in which there were numerous gummata along the cerebral vessels, along the nerves, and in the substance of the brain. The accompanying drawing is taking from his case (Fig. 2).

Hyaline Degeneration.—In addition to these lesions there is frequently found in the syphilitic lesions a hyaline degeneration of the smallest arteries which frequently extends to the capillaries. The entire arterial wall is converted into a homogeneous refractive material which has the characteristic staining of the hyaline substance. It was particularly marked in the spinal-cord lesions of Thomas's case. We have found this a widespread lesion in syphilis of the lungs and kidneys, and in some cases it seemed sufficient to explain the tissue lesions.

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Amyloid Infiltration.—The influence of syphilis in producing amyloid infiltration of the walls of the vessels is well known. Here again we see that syphilis may be one of several causes which produce similar lesions.

Symptoms.—The subject of syphilitic disease of the arteries is too extensive to enable us to lay down any rules by which it may be recognized clinically. The symptoms which it produces will, of course, depend upon the locality of the arteries affected and the extent of the lesions. The most important of these symptoms, those having reference to the cerebral arteries, will be considered under Brain Syphilis.

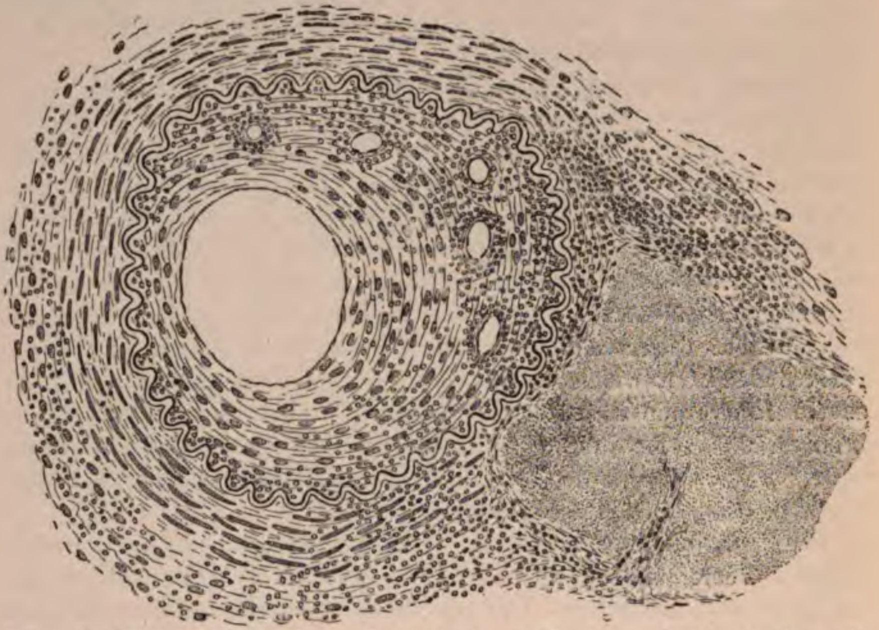

FIG. 2.—Syphilitic endarteritis of a small central artery. The lumen of the artery is greatly narrowed, and a small gumma is formed in the adventitia. The muscles of the media are destroyed at the seat of the gumma.

Treatment.—In spite of the difficulty attending the recognition of the syphilitic character of lesions of the arteries, we think, as a general rule, when there are symptoms of arterial disease limited to one part of the body in a subject with constitutional syphilis, antisyphilitic treatment should be instituted. Permanent cure is rarely to be expected. In the earlier stages, when the disease is only beginning, good may be accomplished, but unfortunately the degenerations which are almost certainly beyond repair are already accomplished before the symptoms, which depend upon lesions secondary to the degenerations, make themselves manifest.

III. SYPHILIS OF THE LUNGS.

There are few subjects which have been the ground of more contention than this. On the one hand, a number of authors insist on its great frequency, and others are disposed to deny that syphilis plays any part at all in the pathology of the lungs. One cause of the confusion which arises is from the attempt to find in the lungs syphilitic lesions similar in character to those produced by tuberculosis, and the question of lung syphilis has frequently been lost sight of in the contention about syphilitic phthisis. We believe, from the evidence which is presented by the literature of the subject, and from our own observations, that while syphilitic lesions in the lungs in case of both congenital and acquired syphilis are not extremely rare, these lesions do not take the form of a destruction of lung tissue with cavity formation. From the character of the lesion of the lung and the time of their appearance it seems most probable that they are the products of a virus or pathological influence which acts on the lung, not from the bronchi, but from the blood-vessels.

In the older literature there are many references to syphilis of the lungs. It was generally described under the head of phthisis e lue venerea, and had reference not to any definite pathological condition of the lungs, but to phthisis supposed to be caused by the effects of syphilis on the constitution. The presence of the disease was not proved by anatomical lesions, but by the favorable influence of antisyphilitic treatment in cases of supposed phthisis. Brambilla has reported the following case, which is often quoted: In a hospital a phthisical patient occupied the adjoining bed to a syphilitic. The first was extremely ill, and there was little hope of his recovery. Through a mistake of the apothecary, the mercury which was ordered for the syphilitic patient was given to the one with phthisis. He soon recovered his former health and vigor, and left the hospital.

The first anatomical description of the lesions of lung syphilis is given by Depaul in 1851. In that year he read a paper before the Paris Academy of Medicine on A Manifestation of Congenital Syphilis consisting in an Alteration of the Lungs. In the year 1837 he presented to the Anatomical Society the lungs of an infant in which there were lesions almost identical to those described in the paper. By some they were regarded as tuberculosis, by others as analogous to the purulent pneumonia of the old. The description of the disease given by Depaul makes it uncertain whether the lesions should be regarded as syphilitic. According to him, the lesion consists in an inflammation of the lung, giving rise to the formation of thickened pus both in the interior of the lung and beneath the pleura. Starting from this work of Depaul's, there has gradually arisen a recognition of the connection between syphilis and certain lesions of the lungs. Dittrich first described a slaty induration of the lungs, chiefly about the bronchi in syphilitic cases. Wagner and Virchow described more fully the white pneumonia of newly born children, and showed its connection with syphilis. Most of the pathological anatomists speak very guardedly about lung syphilis, as do most of those clinicians in whose work we recognize a close acquaintance with pathological anatomy. Strümpel says that, in spite of the rather abundant recent literature on this subject, there is no complete description of lung syphilis. Those physicians who are inclined to regard every lung affection in a syphilitic individual as syphilitic in character place much in the category which is not syphilis. He thinks that practically one is justified in instituting syphilitic treatment where severe lung complications arise in a syphilitic individual, but only in rare instances has this been followed by success. In his recent text-book Osler is equally guarded in his treatment of the subject. While he recognizes certain conditions of the lung as due to syphilis, he speaks of the rarity of the affection and the difficulty of its clinical recognition. The therapeutic test he considers by no means conclusive. He has never seen a case of syphilitic phthisis, either anatomically or clinically. In Flint's text-book there is a short description of the disease, and he also speaks of the difficulty of its clinical recognition. Fagge says he has never been able to satisfy himself of the existence of syphilitic disease of the lung simulating phthisis but pathologically distinct from it. Many of the lung lesions referred to syphilis are different from syphilitic lesions in other organs of the body. The fact that antisyphilitic treatment may be found beneficial in a case of phthisis in a syphilitic subject is no proof of the syphilitic character of the lesions, for it is well known that any treatment which benefits the general health may exert a favorable influence on the disease.

We have given these few extracts from the leading text-books on the practice of medicine in order to show how much doubt and uncertainty clinicians have in reference to the disease. When we examine the leading authorities in pathological anatomy, we find almost the same uncertainty.

Virchow expresses himself very guardedly about the disease in adults, and is inclined to be skeptical about most of the cases which have been previously reported. He recognizes certain lesions of the lungs as most probably syphilitic, particularly if they are found along with other manifestations of syphilis. The most marked of these is a fibrous interstitial pneumonia advancing along the bronchi and blood-vessels, and which, by continued contraction, produces marked deformity of the lung. Along with this there is frequently pleurisy, leading to the formation of fibrous nodules beneath the pleura. There is no specific difference, however, by which we can distinguish this condition of the lung from that found in grinders' asthma. There may also be caseous pneumonia and gummata. He says cavities may form from the softening of the foci of caseous pneumonia, and then comes the question of syphilitic phthisis. The gummata are with difficulty to be distinguished from other caseous foci in the lungs. He also describes another condition essentially different from these, and which he is inclined to regard as syphilitic in character. This is a brown induration of the lungs, which is not the result of heart disease or any circulatory disturbance in the lungs. The color is due to the accumulation of brown pigment in the masses of cells in the alveoli. He considers the essential lesion here an alveolar catarrh. This description of Virchow of lung syphilis in the adult has formed the basis of all subsequent descriptions of the disease. Virchow was the first to describe the white pneumonia of children, and Hecker showed its association with syphilis. This condition of the lung described by Virchow was afterward described by Lorain and Robin under the name of epithelioma of the lung, this name being given it because the alveoli were closely packed with desquamated, fatty epithelial cells.

In his text-book on pathological anatomy, which probably best represents the modern views held on the subject, Orth mainly follows the description of Virchow. After an admirable description of the lesions in the infant, he says that it is much more difficult to say what is syphilitic in the lungs of the adult. The presence of gummata forms our best means for the recognition of the disease; but even these are not easily distinguished from the products of tuberculosis, and the diagnosis can only be made by the absence of tubercle bacilli. He thinks it doubtful if in the adult there is an exudative broncho-pneumonia due to syphilis which can pass into caseation or suppuration. He proposes to drop the term syphilitic phthisis, and to place all syphilitic lesions of the lung under the head of lung syphilis.

The most complete description of syphilis of the lung is found in the monograph of Heller published in 1884. Heller has collected eighty-eight cases from the literature of the subject, in eighty-four of which there were autopsies, and adds two cases of his own. In both of his cases there were other lesions of visceral syphilis, and in the lungs a marked narrowing of the bronchi with extensive formation of connective tissue around them. He says that the changes in the lungs agree in the main with those which we have recognized in other organs as characteristic of syphilis. He denies the existence of syphilitic phthisis, and thinks the cavities described in cases which have been regarded as syphilitic were bronchiectases. In most of these cases we would be more disposed, from the description, to consider them not as syphilitic but as tuberculous. On going over carefully the cases which Hiller reports, we think that twenty-eight of the eighty-four should, in our present knowledge of the subject, be regarded as certainly syphilitic. In many of the cases the description of the lung lesions is that of the typical tuberculous phthisis rather than typical syphilis.

It is remarkable the influence which the general acceptance of Virchow's idea of the nontubercular character of most of the lesions of phthisis had on the ideas of lung syphilis. Tuberculosis being excluded for so many of the cases, the etiological relation between syphilis and the lesions was readily assumed. Most of the cases of syphilitic phthisis reported come in the time of the most general acceptance of the views of Virchow, from the beginning of 1860 to 1875. They then become less frequent with the gradual recognition of tuberculosis as the sole cause of phthisis, and with the means given for the recognition of tuberculosis by the tubercle bacillus.

One of the most remarkable articles on the subject of lung syphilis is that of Pancritius (Berlin, 1881), in which he speaks of syphilitic phthisis as one of the most common diseases—one that decimates the flower of the land. Most of the cases he reports are clinical, and consist of rather vague pulmonary lesions with frequently equally obscure general manifestations of syphilis, which were cured by the use of iodide of potassium. From what can be made from the reports of autopsies which he gives, it would seem that the most of the cases were tuberculous.

The recent article of Satterthwaite affords an example of the confusion of mind which many clinicians have concerning this disease. Some of the lesions which he describes are certainly syphilitic, while others have nothing about them which speaks in favor of syphilis. He divides the lung lesions into five groups: (1) Presence of gummata. These are more prominent in the middle and lower lobes than elsewhere. (2) Appearances which simulate those of miliary tuberculosis, but without tubercular bacilli. (3) Fibroid induration. (4) Softening of the miliary deposits and cavities which may be formed at the apices, as in tubercular phthisis. (5) Associated with these intra-pulmonary changes there is an unusual amount of fibrous pleurisy. The cases which the author gives do not lend much weight to his arguments. Only two out of the six might possibly be regarded as syphilitic.

CONGENITAL SYPHILIS OF THE LUNGS.

Congenital syphilis of the lungs in the infant differs in many ways from the lesions in acquired syphilis. The disease is more frequent in congenital than in acquired syphilis, but even in this it is rare. There are no extensive statistics on the subject. Müller examined eighteen still-born children, the subjects of congenital syphilis, and found the lungs diseased in but one case. In one hundred and forty-four cases of congenital syphilis autopsied by Chiari, syphilis of the lung was found in twenty-two cases. He divides the cases into four groups, the first embracing the macerated fœtuses; the second, those which died from syphilis, having lived from a few minutes up to one week; third, those which died from some other affection, living up to one year; and, fourth, cases of tardy hereditary syphilis. There were twenty-nine in the first group, forty in the second, seventy-one in the third, and four in the fourth. In the first group was one case, in the second seventeen, and in the third four. It is less frequent than syphilis of the liver. Haslund has found but four cases in one hundred and five autopsies on children with congenital syphilis. Forster reports the autopsies of thirty-six children with congenital syphilis, and found that fifteen of these died from the lung lesions. He does not separate the lesions typical of syphilis from the intercurrent broncho-pneumonias. Other authors have called attention to the frequency with which broncho-pneumonia and other affections not characteristic of syphilis are found in the lungs of syphilitic children.

In the newly born the disease appears in two forms, which in many cases seem to pass over into each other. In the one form there is a formation of perfectly characteristic gummata, and in the other a more diffuse pneumonic process. The gummata may appear in all portions of the lungs, but, as in the adult, they seem to be more frequent in the posterior and lower portions. The size varies from that of a pin's head to that of a cherry. The more recently formed represent gray or grayish-red nodules, not sharply separated from the surrounding lung tissues, which shows some consolidation. The older gummata are more sharply circumscribed, white and opaque in color, and frequently have an ill-defined capsule. The opacity of the nodule is due to the fatty degeneration and necrosis which is characteristic of gummata. The central necrotic mass is always softer than in the gumma of the lungs of adults, but is firmer than the tubercular caseation. The gummata are more infrequent than the diffuse syphilitic lesions. Along with the gummata, but sometimes independent of it, there are diffuse inflammatory changes. This is the form of white pneumonia which was first described by Virchow and Weber, and the connection of which with syphilis was just established by Hecker.

Greater or less areas of the lung, whole lobules or even entire lobes, may be affected. The diseased portions are more consistent than normal, free from air even in children which are born living, and of a clean, grayish or whitish color. The first case seen by Virchow was in a medico-legal examination; the lungs were so light in color and so voluminous that it was first thought the child had breathed. Both lungs sank in water. Wagner speaks of the process as diffuse syphiloma. On microscopical examination the alveoli are found filled with large, swollen, fatty epithelial cells, the white color of the lungs being due principally to this and the anæmia. The walls of the alveoli are thickened, and frequently some growth of fibrous tissue extends from the walls into the alveoli. The lining epithelium is swollen and cuboidal. Places are frequently found in which growth of young connective tissue with numerous spindle-cells more or less take the place of the pneumonia. Some of these show the beginning caseation of gummata. Birch Hirschfelt considers that the beginning of the affection, which can frequently be observed in stillborn children of the sixth or seventh month, is lobular and peribronchial. The lung is then filled with numerous very small lobular peribronchial foci, which are not sharply separated from one another. He designates these foci as miliary gummata, and lays especial stress on the fact that the interstitial growth of connective tissue is chiefly localized around the vessels in which the adventitia and intima are especially thickened. That is a peculiarity which is also found in the circumscribed gummata, and must be of considerable importance for the course of the process, since it must produce an anæmia. Although the congenital form of lung syphilis is so much more characteristic than the acquired in some of its forms, especially in that of circumscribed gummata, it presents so much similarity to tuberculosis that mistakes in diagnosis may arise. Virchow and Depaul are inclined to consider all the cases reported as congenital tuberculosis to be syphilitic in character. Of course, in a case of doubt, the absence of tubercular bacilli, or the test of animal inoculation, would be conclusive. Clinically the disease has little or no importance. It is most commonly found in children, who die within a few days or weeks after birth. It seems not to be so commonly found in stillborn macerated fœtuses. The children may or may not have symptoms of lung trouble, and there are no means by which we can with any degree of certainty diagnose the condition during life. We have neither clinical nor anatomical evidence to show that the condition is ever recovered from.

ACQUIRED SYPHILIS OF THE LUNGS.

The recognition of lung syphilis in the acquired syphilis of adults is much more difficult. Of course, the condition with which it is most apt to be confounded is tuberculosis, and in congenital disease this difficulty, from the extreme rarity of congenital tuberculosis, does not play much part. Although syphilitic formations do present a certain similarity to those of tuberculosis, they have a more or less characteristic histological picture. The main distinguishing feature is the greater tendency to the formation of fibrous tissue in syphilis. In the lungs the matter offers more difficulty than elsewhere, because tuberculosis here is so complicated with chronic inflammatory processes leading to the formation of fibrous tissues. As a rule, in almost any lesion of the lung supposed to be due to syphilis, an examination for tubercle bacilli, and in many cases inoculation of animals, should precede a certain diagnosis.

From the study of the various authors on the subject, and from our own observations of four cases, we think that the lesions of the lung which should be regarded as syphilitic are as follows:

1. **Gummata.**—This, of course, is the most characteristic of all syphilitic lesions, and between which and tuberculosis the diagnosis, difficult in any organ, is rendered much more difficult in the lungs. The gumma, as the tubercle, is composed for the most part of granulation tissue. In both, a considerable portion of the mass is made up of exudation. In both there are fatty degeneration and caseation of the cells. There is nothing distinctive in the character of the cells, for in each we find granulation cells, epithelioid and giant cells. Giant cells, though met with, do not play so prominent a *rôle* in the gumma as in the tubercle. We are also able to make the differential diagnosis between the two by the fate of the cells in each. Though the tendency of the cells in the gumma, as in the tubercle, is toward fatty degeneration and caseation, the process is not so rapid in the gumma, nor so complete. Before necrosis takes place, they for the most part develop into connective tissue, so that in the gumma there is a necrosis of tissue rather than of cells alone. There results a very much firmer, denser, caseous mass than we have in the tubercle. We can not so easily crush the gumma, and it does not separate by tearing. The gumma differ greatly in appearance, depending on their age. When fresh, they have an opaque, grayish or grayish-red color, and are not very sharply separated from the surrounding tissue. The lung around them generally is more or less consolidated. The older gummata have an opaque white color, and are separated from the surrounding lung by a dense zone of pearly, transparent connective tissue. We frequently have an appearance as though the gumma was composed of the union of several areas, transparent lines of connective tissue running through the mass, and which gradually unite with the capsule. We are enabled in another way to make the diagnosis between gumma and the tubercle. The tubercle serves as a focus of infection, and close observation of the tissue in the vicinity of a large tubercle will almost always show a number of small recent miliary tubercles. The gummata may vary greatly in size; the miliary gummata of the lung so frequently described were probably not gummata, but tubercles. Porter has described one case with a plate. The plate represents a perfectly characteristic tuberculous lung, a combination between fibrous phthisis, miliary tubercles, and tuberculous broncho-pneumonia. Gummata were present in three out of four cases of lung syphilis which we have seen, and they varied in size from a cherry seed to a hickory nut. Henop has described one case of lung syphilis in which there were numerous gummata in both lungs, from the size of a nut to that of a goose egg, without any breaking down of tissue.

On histological examination, we find the center of the gumma composed of firm, dense tissue, in which there is considerable unclean detritus. On careful examination, we can recognize in this the remains of the alveolar walls, and on staining with the fibrin stain we may find small masses of this corresponding more or less with the alveoli. The fibrous tissue sur-

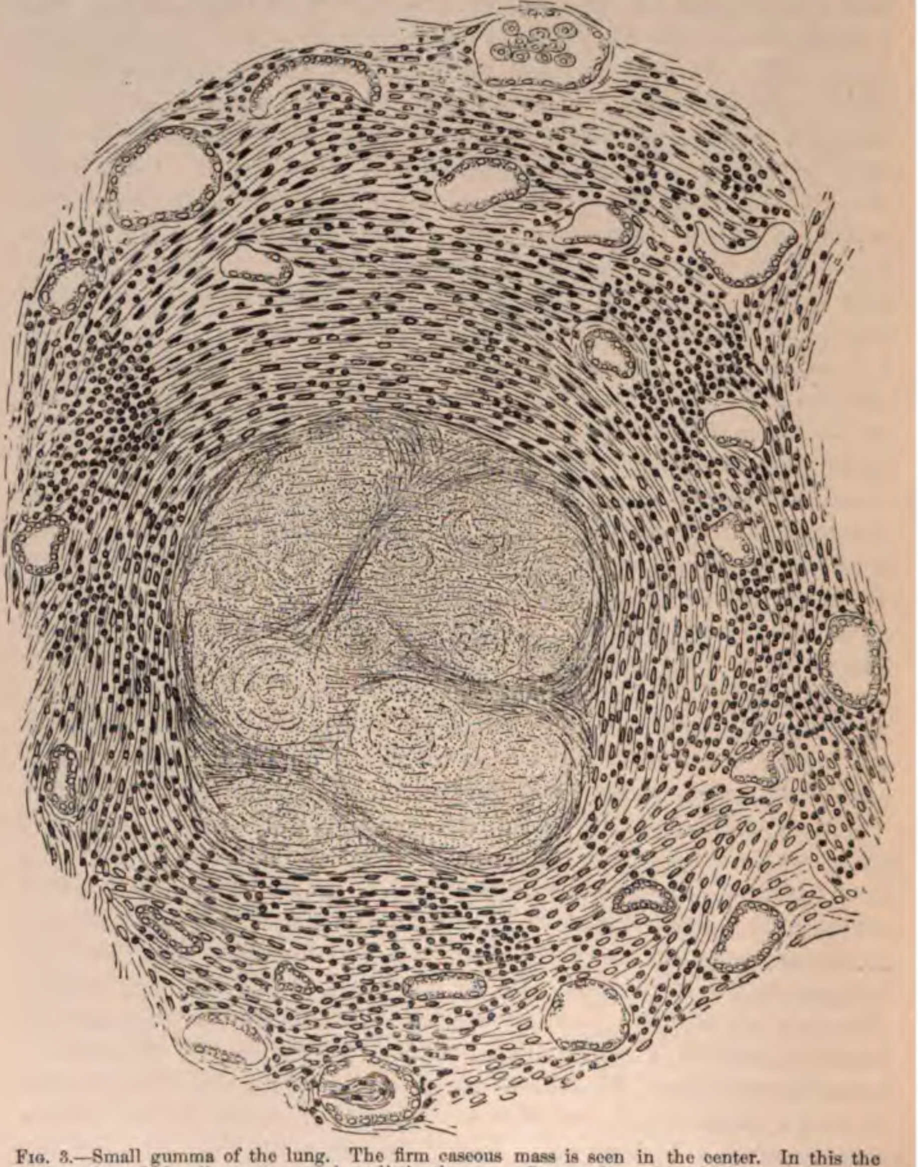

FIG. 3.—Small gumma of the lung. The firm caseous mass is seen in the center. In this the remains of alveoli are more or less distinctly seen. Surrounding this there is a great formation of interstitial tissue. The alveoli of the lung are compressed, and the epithelium has become cuboidal.

rounding it is dense, and poor in cells. There are frequently small projections of this extending from the capsule into the caseation, and in these blood-vessels may often be found. This probably represents an attempt at organization of the caseous material in much the same way that a thrombus is organized. The surrounding connective tissue passes without any sharp line into the surrounding lung (Fig. 3). The gummata are most often situated in the lower or middle and posterior portions of the lung. In one of our cases there was a large gumma in the apex of the left lung. Frequently they are found around the root of the lung, or just below this. In syphilis of the lung, both in the formation of gummata and in the more diffuse processes, the apices of the lungs are generally free; and this is a point of much importance in separating the disease both clinically and anatomically from tuberculosis. The gummata show little or no tendency to break down, and they have not a close connection with the bronchi. In the lobule they appear to be rather in the periphery than in the center.

2. Diffuse Infiltration.—As in congenital syphilis, so we have here, and usually in connection with the gumma, a more diffuse infiltration of the lung. This takes two forms. There is a more acute form, in which the consolidation is for the most part composed of a fibrinous exudation in the alveoli, mixed with large, fatty, desquamated epithelial cells. In the other form which is more closely related to the gumma, there is a general and diffuse formation of connective tissue. Both forms are usually associated together. There are areas of greater or less size of this consolidation. Frequently these areas are close together, or they will coalesce, giving rise to a consolidation of a considerable portion of the lung. In one of our cases almost the entire posterior portion of the lower lobe of the right lung was affected, and in another a large part of the lower portion of the upper lobe of the left lung. The consolidated lung has a reddish-gray, opaque appearance, and the single foci of which it is composed may be made out. On section the cut surface is smooth, the lung is more resistant, and can not be easily torn. On squeezing it a small amount of mucopus comes from the cut bronchi. On microscopic examination, the alveoli contain a small amount of fibrin with coarse filaments and fatty epithelial cells. The alveolar epithelium is swollen, and converted into cuboidal cells. The alveolar walls are thickened by the formation of connective tissue, rich in spindle-cells, and this frequently grown into the form of buds. When the portion of the focus most exterior and in which the lesions are most recent is examined, there is frequently found a marked atrophy of the alvoelar walls, (Fig. 4.) Where this is most advanced the alveolar wall is changed into a thin, smooth mass of tissue with but few nuclei scattered along it. With this atrophy of the alveolar walls there is obliteration of the capillaries, which seems due to a hyaline degeneration of their walls. They are converted into rigid tubes, which remain open on section, and many of them are so narrow as to scarcely admit a red blood-corpuscle. The hyaline material stains slightly with eosin. It is more refractive than connective tissue, and best seen in sections made

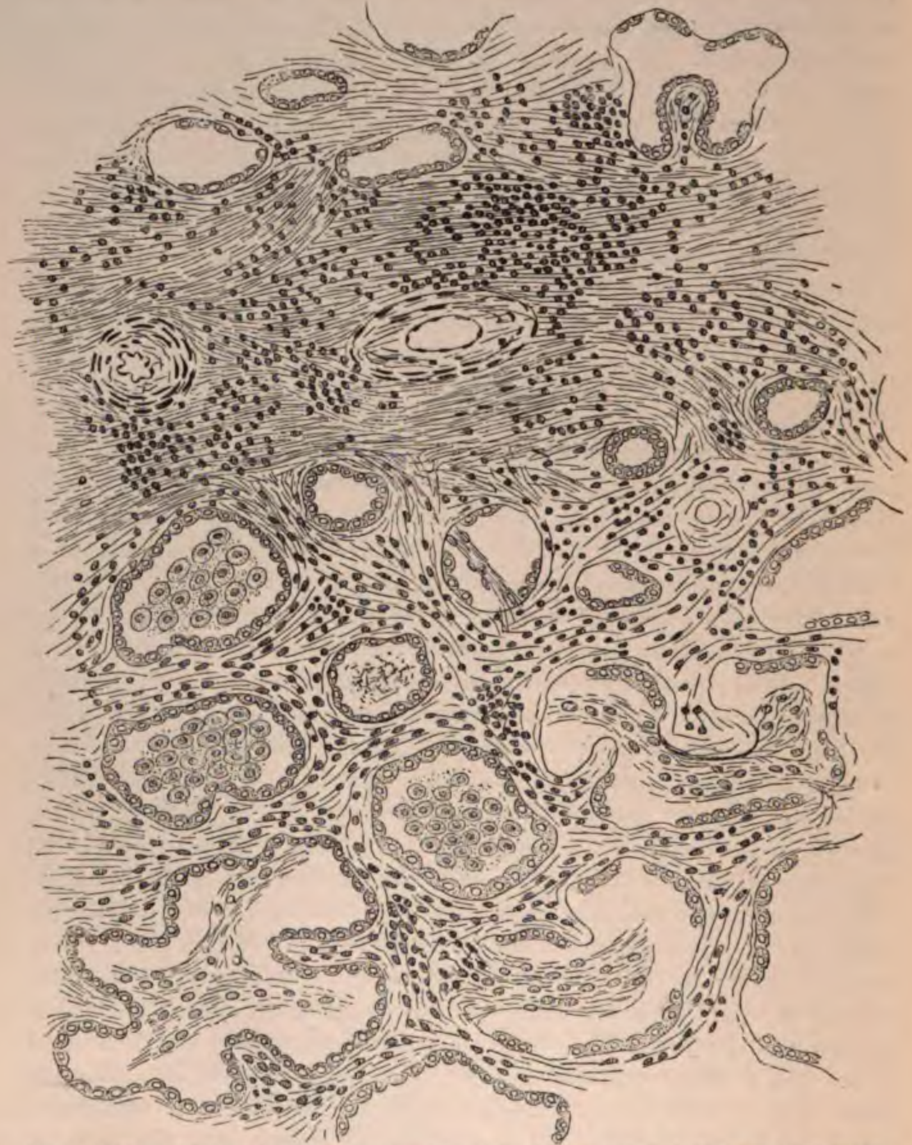

FIG. 4.—Diffuse interstitial syphilitic pneumonia. The alveoli contain both large, fatty degenerated cells and organized connective tissue. The dense mass of connective tissue represents the boundaries between two of the lobules of the lungs.

after hardening the tissue in alcohol and straining with picro-carmine. In such specimens it stains a bright yellow color. The large epithelial cells in the alveoli also undergo hyaline degeneration. The cells frequently contain small hyaline masses, and globules of hyaline, evidently resulting from this transformation of the cells, are found in the alveoli. The connective tissue, even when it appears in the form of a thickening of the alveolar walls, does not seem to be formed here, but to grow into the tissue from the neighboring blood-vessels and bronchi. Long processes of it may frequently be traced from the larger blood-vessels for a considerable distance into the atrophied tissue. There occurs in most instances a gradual transition between such a condition of the lung and an almost complete transformation into connective tissue. Its growth becomes more extensive, and the alveoli either disappear entirely or they are converted into small, irregular fissures lined with cuboidal epithelium. The connective tissue is usually loose and succulent, and portions of it may become hyaline. There is a notable absence of acute inflammation, as is shown by the absence of leucocytes in the process. The bronchi usually contain them, and there are some in the neighboring alveoli, but they are generally conspicuous by their absence. In three of our four cases of lung syphilis, this form of pneumonia, which is in many respects very similar to the white pneumonia of infants, and may be regarded as a true syphilitic pneumonia, played a prominent part, and the gummata are usually formed in it.

3. Fibrous Peribronchitis and Periarteritis.—Another lesion of the lung to which attention has been called by most writers on the subject is the fibrous peribronchitis and periarteritis. In this there is a formation of fibrous tissue in the form of dense bands radiating from the root of the lung along the bronchi and blood-vessels toward the pleura (Fig. 5). There is, also, a considerable destruction of lung tissue, not only by the direct substitution of connective tissue for it, but by the subsequent contraction of the connective tissue. The most marked deformity of the lung results from this contraction. There are deep and irregular depressions of the pleura corresponding to the insertion of the bands, and the intervening lung is emphysematous. There are also extensions of connective tissue from the thickened pleura into the lung which are not connected with the peribronchial bands. Gummata may be found in the connective tissue. This form was most prominent in one of our cases. Along with a peribronchial affection there may be an affection of the bronchi. This sometimes represents an extension of syphilis of the trachea into the bronchi. Schintzler has called special attention to this disease of the bronchi, which was found in several of his cases. The bronchi are of irregular caliber, they are stenosed in places, and dilated in others. The mucous membrane is atrophic, the surface dry, and there are either hard superficial ulcers or extensive stellate cicatrices. The fibrous peribronchitis often seems to be a definite extension of the cicatricial tissue. Virchow gives two typical cases. In one there was a syphilitic cicatrix of the trachea extending into both bronchi, and producing stenosis. Below the stenosed area the mucous membrane of the bronchi was reddened, and the caliber was dilated. In the lower lobe of one lung there were several larger bronchiectases. Otherwise the lungs were normal. In the other case there were numerous syphilitic cicatrices in the pharynx. In the deep bronchi there were numerous radiate hard

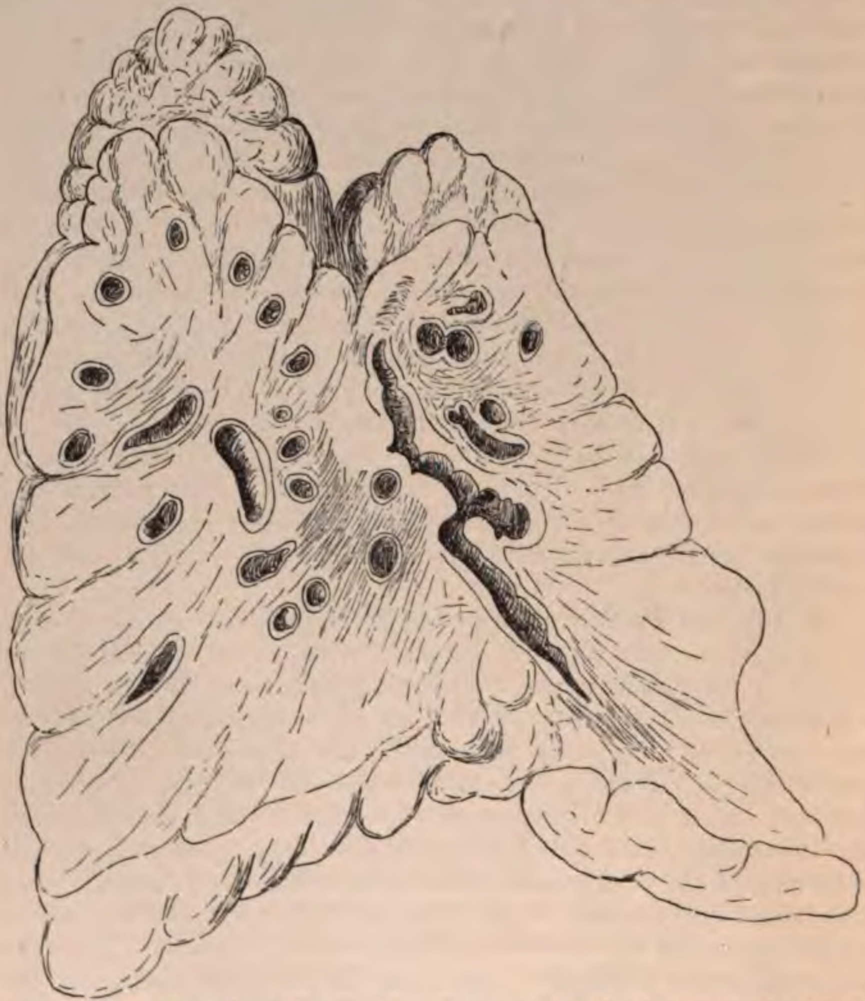

FIG. 5.—Syphilis of the lung. The entire lung is dense, and the pleural surface greatly deformed by the contraction of the fibrous bands which pass from the center of the lung to the pleura. The open spaces in the section correspond to the thickened arteries and bronchi.

cicatrices with extensive slaty induration of the lung around them. One of the cases which we have seen bears some resemblance to this first case of Virchow's. In this case there was extensive ulceration of the lower part of the trachea, with cicatrices and stenosis. At the bifurcation the trachea would only admit a small leadpencil. The lumen of the left bronchus was much narrowed by cicatricial contraction; that of the right, slightly so. In both lungs the bronchi were dilated and the mucous membrane reddened. Usually there is more or less simple bronchitis associated with the various changes in the lungs. It was present in a marked degree in two of our cases, and to a slight degree in the other two. The smaller bronchi were filled with pus cells, which extended into a few of the surrounding alveoli. It rarely forms any part of the symptoms observed during life, and in our cases was shown to be recent from the acuteness of the suppuration and the absence of all evidences of chronic change.

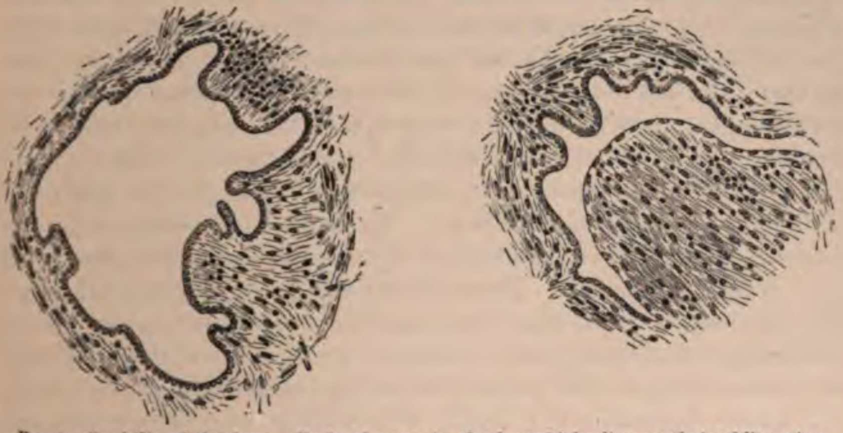

FIG. 6.—Syphilis of the lung. Early changes in the bronchi leading to their obliteration.

It seemed only to have come on in the last days of life. In addition to these changes, the smaller bronchi often undergo an ingrowth of fibrous tissue leading to a narrowing, and in some cases an obliteration, of their lumen. It is the same process as that leading to the obliteration of air cells (Fig. 6). The earliest change found leading to this condition is a small cell infiltration, both around the bronchus and within the muscular coat. The mucous membrane is elevated and the folds accentuated. In more advanced cases there is a dense connective tissue containing comparatively few cells beneath the epithelium. This is not usually symmetrically arranged around the entire lumen, but it projects in large polypoid masses. It is a common lesion in the syphilitic lung, and is of some diagnostic value.

Now, all these lesions may be found in syphilis of the lung. The proof that they are syphilitic is that there is evidence of syphilis elsewhere in the body; they are not found when there is not evidence of syphilis, and in their general nature they agree with what we know of syphilitic lesions in other parts. Some of them—the gummata, and even the pneumonia—resemble some manifestations of tuberculosis, but this can always be excluded. Their seat and their course are different from tuberculosis. Any one of them may be found alone, but they are generally more or less combined.

4. Ulcerative Lesions.—In all the changes of the lung we have spoken of there has been no reference made to the ulcerative lesions of the lung found in phthisis. Hiller denies that there is a syphilitic phthisis, and thinks that all the cavities in the lung which have been described in lung syphilis are due to bronchiectasis. Virchow and most authors who have devoted much attention to the pathological anatomy of the disease are also disposed to doubt that there is an ulcerative syphilitic phthisis similar to that produced by tuberculosis. It could only arise from the ulcerative destruction of gummata, and these do not show anywhere in the viscera the same tendency to destruction that tubercles do. Not only is the connective tissue which forms their matrix more resistant than the caseous cells of the tubercle, but they do not have the same relation to the bronchi. A close study of the syphilitic lesions of the lung shows that they usually begin not in the center but in the periphery of the lobule. We can not go so far as to deny absolutely the ulcerative destruction of gummata and the formation of small cavities in this way. In one of our cases, in the apex of the right lung, there was a hard, opaque, circumscribed irregular mass, of a yellowish color, measuring four millimetres in its longest diameter, which was broken down at one point so as to form a cavity eight millimetres in diameter communicating freely with a bronchus. The whole mass was surrounded by firm grayish cicatricial tissue radiating in all directions along the bronchi and blood-vessels through the upper third of the lung. Some of the clinical evidence can hardly be denied. There are three cases in the literature in which gummatous masses were at various times expectorated during life, followed by complete recovery under antisyphilitic treatment. The clearest of these cases, and which leaves little doubt as to the correctness of diagnosis, is the frequently quoted case of Von Cube. Nine years after infection the patient developed symptoms of phthisis, for which he went to the Riviera. There was cough, hoarseness, and emaciation, and much expectoration of fetid secretion. In the secretion some small masses of tissue as large as a pea were found. The expectoration of these masses was preceded by hectic fever, night-sweats, and severe spasmodic cough. At one time twenty grammes of this material were expectorated. Microscopic examination of the masses showed that they were composed of remains of broken down lung tissue, in places almost concealed by development of fibrous tissue. The portion of lung involved was found, in examination, to be just beneath the scapula on the right side. Complete recovery followed the use of mercury. The other cases, which are less definite than that of Von Cube, are reported by Scheck and Guntz. In addition to these, there have been numerous cases reported in which evidences of phthisis with physical signs of cavity formation have developed in the course of syphilis, and have been entirely recovered from under antisyphilitic treatment. The gummata may soften, break down, and finally disappear in the lung, as in any other part of the body; their place is taken by cicatricial tissue, and there is not the continuous extension of the process which forms so marked a feature in tuberculosis.

Frequency.—Syphilis of the lung in adults must be considered a very rare disease. In 6,000 cases of syphilis in all stages treated in the commune hospital of Copenhagen, it was found only in two cases. In 18 autopsies of adults with acquired syphilis it was found three times. In 97 autopsies on acquired syphilis, Chiari found three cases of syphilitic cicatrices of the lower trachea which extended in the bronchi, and in only one case gummata of the lung. We have found four cases of lung syphilis in 120 autopsies on deaths from all causes. Peterson has collected 88 cases of autopsies in acquired syphilis and found syphilis of the lung in 11 cases. In all statistics of autopsies there is a great deal of difference of the relative frequency of lung syphilis, depending on the varying views as to what constitutes the affection. Statistics as to its frequency, gleaned from purely clinical reports, are utterly valueless.

The disease must be considered one of the late manifestations of syphilis. We have found no cases reported, either clinically or anatomically, where the diagnosis appeared certain, earlier than two years after infection, and from this up to twenty.

The situation of the lesions in the lungs is of great clinical importance. In most cases both lungs are affected, but the disease may be localized in one. The apices of the lungs are generally a point of the greatest importance in the differentiation from tuberculosis. Most frequently the middle and lower lobes are affected, and the posterior portions.

Diagnosis and Symptoms.—From what we have said of the character and distribution of the lesions in lung syphilis, it will readily be seen that there can be no one point which will enable us to certainly diagnose the disease. The clinical diagnosis is most difficult and uncertain, and can only be made by taking a great number of circumstances into consideration. The most important of these is the diagnosis of syphilis from the history of the patient, or its manifestations in some other part of the body. Sacharjin and Pavlinoff lay stress on the absence of a tuberculous family history, and a more robust habit of body than would be found in the same condition of the lung in tuberculosis. Rollet considers that the disease may be diagnosed by the symptoms. The most important of these are the absence of fever, the marked dyspnœa which can even become orthopnœa, a feeling of weight and pressure on the breast, a painful dry cough, and sometimes hæmorrhage. The sputum, at first very spare, later becomes abundant, and similar to tuberculous sputum. On percussion, there is dullness in the middle and posterior portions of the thorax; on auscultation, there may be the same signs as in tuberculosis. The main points in diagnosis given by Schniltzer are the course of the disease, which is much slower than tuberculosis, and the body generally suffers less; the localization of the lesions; fever may be absent, and in any case it is unimportant, sputum less abundant than in tuberculosis; the dyspnœs, which is always much greater than the lesions of the lungs seem to warrant. Fournier divides the disease clinically into three periods: 1. The beginning, which is always insidious, and which does not give rise to any symptoms. 2. When the anatomical changes have acquired a certain development they cause various troubles—(1) slight respiratory difficulty; (2) cough, infrequent, feeble, and often dry. At this time the physical signs are insignificant, or absent if the lesions are seated in the depths of the tissue. When the lesions are superficial, there may be distinguished a diminution or an obscurity of the percussion note over a circumscribed point, and on auscultation feebleness of the respiratory murmur, or a peculiar rudeness of the vesicular murmur. 3. As the lesions extend there is more involvement of the functions of the lung, and the symptoms and physical signs become more accentuated. The dyspnœa increases, but never passes a medium intensity. Cough and expectoration become more abundant. With this the signs of cavities gradually disappear.

Dyspnœa is always a marked symptom of lung syphilis. It is in most cases greater than we can explain by the involvement of the function of the lung by the contraction of the cicatricial tissue. The dyspnœa may be due to a large extent to the interference with function caused by the degeneration of the capillaries. It often rises to actual orthopnœa. It may be more or less continuous, or may be paroxysmal, simulating attacks of asthma. The paroxysmal attacks almost always take place at night. Cough is not very frequent, and generally is hard and dry. The character of it may, of course, be frequently changed by attacks of bronchitis, to which the syphilitic lung seems very liable. The bronchitis may be a permanent feature. The expectoration is slight in amount. The sputum is grayish and transparent, and has not the muco-purulent character of the tuberculous expectoration. The character of the sputum will, of course, be modified by the presence and extent of the bronchitis. A special character may in certain rare cases be given it by the presence of fragments of broken-down gummata. The disease is generally afebrile. There may be some slight attacks of fever due to complications, but in syphilis of the lung pure and simple there is not opportunity given for the absorption of fever-producing substances. Various authors have described hæmoptysis in the disease. It is most probable that the cases in which it was seen were tuberculosis, and not syphilis. If it appears at all in lung syphilis, it is rare and unimportant, or due to some complication. The lesions in lung syphilis are not such as to produce hæmorrhage. The physical signs are those which are due to consolidation of the lung. The lesions are usually in such parts of the lung as are least accessible to investigation.

In most cases the diagnosis will only rest between syphilis and tuberculosis. The most important means of diagnosis is the absence of tubercle bacilli in the sputum; in most cases the absence of cavity formation, and the location of the lesions.

Little need be said about the treatment. In the first place, it should be antisyphilitic; in the second, the removal of complications.

At one time it was held that syphilis exerted a modifying influence on the anatomical character of tuberculous lung lesions. We have never seen any case of tuberculous lesions in a syphilitic in which there seemed to be any influence exerted on the character of the lesions by the tuberculosis.

IV. SYPHILIS OF ŒSOPHAGUS, STOMACH, AND THE INTESTINES.

Although the mouth, pharynx, and the lower part of the rectum are among the parts most frequently attacked by syphilis, syphilitic lesions of the œsophagus, stomach, and small and large intestines, are among the rarest, if not the rarest, of the manifestations of the disease. The frequency with which the mouth and the lower part of the rectum are attacked may possibly be explained by the close connection of these parts with the cutaneous surface and the extensions of the skin lesions to the neighboring mucous membrane. Little as we know about the virus of the disease and the mode of its dissemination, it seems most probable that in the infection of the alimentary tract the virus does not enter from the mucous surface, but is conveyed by the blood-current. We know that in other diseases the alimentary canal possesses a relative protection against the action of a virus disseminated through the blood-current. Thus, in tuberculosis, between which disease and syphilis analogies are so frequently drawn, when the tubercle bacilli enter the lumen of the intestine, either from swallowed sputum or in some other way, and the mucous surface is directly opposed to their action, the various forms of tuberculosis are often met with. In cases, however, of the dissemination of the virus by the blood, as in acute miliary tuberculosis, the alimentary canal possesses, as compared with other organs, a relative immunity. We may suppose that there is in both diseases some protection afforded, either by the anatomical arrangement of the tissue or the nature of the tissues themselves, to the action of viri carried in the general circulations.

SYPHILIS OF THE ŒSOPHAGUS.

Syphilis of the œsophagus may be dismissed with a word. There are but few cases reported in literature, and most of these are not without doubt. There are cases of extension of syphilis of the pharynx to the upper portion of the œsophagus, and Birch Hirschfeld has reported a case in which, in a man thirty-five years old, with definite lesions of syphilis in the liver and lymph glands, there was a syphilitic ulcer of the lower portion of the œsophagus, which extended into the stomach. This ulcer was the result of a gummatous infiltration of the wall of the œsophagus, and was clearly syphilitic in character.

SYPHILIS OF THE STOMACH.

Syphilis of the stomach, though rare, is much more common than of the œsophagus. Our knowledge of the disease here has been materially advanced by the very comprehensive work of Chiari. Most of the earlier literature on the subject may be neglected. It consists either of descriptions of lesions which might well be referred to other causes, or of clinical descriptions of various forms of gastric affections which were benefited by an antisyphilitic treatment. Not only in this, but in all other forms of visceral syphilis, there should be the greatest skepticism regarding such cases. It may very well be conceived that the functions of the stomach or of any internal organ might be impaired by the presence of the syphilitic cachexia, and when this is set aside by appropriate treatment restoration of function would follow. Cruveilhier was disposed to think that many of the cases of ulcer of the stomach were due to syphilis. More recently Galliard takes the same view, and thinks the reason why syphilis is not more often recognized in the stomach is because the lesions it produces are not sufficiently characteristic. There have been a small number of cases of undoubted syphilitic disease of the stomach reported by Klebs, Cornil and Ranvier, Weichselbaum, and Birch Hirschfeld and Chiari. From these cases we see that almost the only form in which the disease appears is that of gummatous infiltration of the mucosa and submucosa with subsequent ulceration. In the case of Klebs, there was an ulcer on the posterior surface of the stomach near the small curvature. The mucous membrane here was ulcerated in a number of small places, giving the appearance often observed in syphilis of the base of the tongue. Around this the other layers of the wall of the stomach were thickened and of a yellowish caseous character. From the ulcer radiating cicatrices extended into the surrounding thickened tissues. All these cases, with the exception of one case of Birch Hirschfeld's, were in adults. This case was in a newly born infant with skin syphilis and gummata in the liver and lungs. In the pylorus there was a slightly elevated thickened area as large as the palm of the hand. It was of a whitish color and tolerably firm consistency, and was formed by an infiltration of round-cell granulation tissue in the mucosa and submucosa. One of the cases of Chiari's was in a fœtus with hereditary syphilis, and the other in a man twenty-three years old, who died of syphilis and tuberculosis. In both, the lesions of the stomach were due to the breaking down of a gummatous infiltration of the submucosa. The great infrequency of the affection is seen in the statistics which Chiari gives. Out of 243 autopsies on syphilitics, of which 145 were cases of hereditary and 98 cases of acquired syphilis, he has only found these two cases in which the stomach was affected. In the cases of congenital syphilis the changes which were found in the stomach, and which could not be recognized as syphilitic from their character, were few, and were chiefly due to circulatory disturbances. In 36 of the 98 cases of acquired syphilis there were lesions found in the stomach. In 14 of the 36 cases the lesions were due to chronic passive congestion from liver syphilis, in 7 to congestion from pulmonary emphysema. The other cases were generally catarrhal, and were due to other causes than syphilis. In one case gummatous ulceration was found. We have no definite knowledge of the symptomatology of syphilis of the stomach. The lesions are not sufficiently characteristic to give rise to any clinical manifestations by which the disease might be recognized. In an extensive syphilis of the liver we may have chronic catarrhal gastritis, due to chronic passive congestion from the impediment to the liver circulation; but the gastritis in this case does not differ from that in chronic passive congestion generally.

SYPHILIS OF THE SMALL AND LARGE INTESTINES.

Syphilis of the small and large intestines, though relatively rare, is yet much more common than syphilis of the stomach. It is more frequent in congenital syphilis than in acquired. In both it takes the form either of circumscribed gummata of the submucosa, with or without ulceration of the overlying mucous membrane, or of diffuse infiltration. Kundrat and Mracek investigated nine cases of congenital intestinal syphilis. The children were either born dead or died a few hours after birth. In eight of the cases the lesions were in the small intestine, in one the large intestine was also affected. They distinguished two forms of the disease. In one form the process is localized in the Peyer's patches or the solitary glands; in the other, areas of the disease are scattered irregularly over the entire intestine. The process begins with a small cell infiltration in the neighborhood of the blood-vessels, which leads to a growth of their endothelium. By this, closure of the vessels with a following necrosis and ulceration are produced. They think that the process is always accompanied by a catarrh which produces a thick mucus and leads to thickening of the meconium. The peritonæum in the neighborhood of the ulcers is also frequently affected. It is thickened, and adhesions are formed with adjacent viscera. Baumgarten has published an interesting case in an infant who died of congenital syphilis a few hours after birth. There was a diffuse exudative process in the serosa, leading to the formation of dry fibrinous masses which bound the intestines more or less together. Beginning shortly below the duodenum there was an almost continuous affection of the entire intestinal tract. This took the shape, for the most part, of circumscribed thickenings, which were either visible, or they could be felt on passing the finger along the bowel. No connection could be made out between these formations and the lymphatic tissue. He did not find the participation of the small arteries in the process which Kundrat and Mracek had described. There was a generally diffuse gummatous formation in the submucosa. Miliary and submiliary nodules were found, but they were subordinate to the diffuse process. Only a single ulcer was found in the ileum near the valve. The ulcer was two and a half centimetres in diameter, and had an irregular, dirty base. Examined from the outside the entire intestine revealed a remarkable hardness and stiffness. The histological examination showed in the entire intestine the structure which Wagner has described in the syphiloma. There were neither giant cells nor epithelioid cells similar to those of the tubercle. Chiari has found seven cases of intestinal syphilis in one hundred and forty-four autopsies on congenital syphilis. In two of these cases the large intestine was affected, once in connection with the small intestine, and once alone.

The disease is extremely rare in acquired syphilis. Chiari did not find a single case in his ninety-eight autopsies. Of the cases reported in the literature of the subject, most of them, from the description, are clearly due to other causes than syphilis. Birch Hirschfeld has reported one case of gummatous infiltration of the wall of the small intestine. The writer has seen one case in which, in a woman of forty, with a stricture of the rectum and other evidences of syphilis, there were numerous ulcers of the small intestine. No cause could be assigned for the ulcers. The result of the histological examination, the absence of gummata or extensive small cell infiltration around the vessels, did not warrant us in placing these in any relation with syphilis. There was no amyloid degeneration. Apart from its extreme rarity syphilis of the intestines does not possess any clinical interest. The lesions are not sufficiently characteristic to enable us to recognize it.

V. SYPHILIS OF THE LIVER.

There is much difference between the lesions in congenital syphilis of the liver and those of the acquired form. We will first take up the lesions of the liver in the congenital form of the disease.

CONGENITAL SYPHILIS OF THE LIVER.

The specific syphilitic affections of the liver have been the longest and most clearly known of any of the visceral lesions in congenital syphilis. These lesions appear in a threefold character; they are either diffuse, or in the shape of miliary and larger nodules. These larger nodules are analogous to the gummatous affections of the liver in the acquired form. Gubler was the first to describe the diffuse form. According to him, the disease can be general, or a partial one. In the first case the liver is always hypertrophied, of a flinty color, hard and inelastic; the normal markings of the lobules disappear. On section, it sometimes creaks like cartilage, it is anæmic, and its cut surface has a smooth, homogeneous appearance. When the affection is early, or a partial one, the changes are less marked, the hypertrophy is not so great, and only single portions of the organ have the hard feeling and the flinty color. Even these local changes are usually less marked than in the general form, and on section a yellow serous fluid can be expressed from the organ. The capillaries and all blood-vessels in the diseased parts are obliterated; no fluid can be forced through them by injection. On the surface corresponding to the places most affected there is a fibrinous exudation, and slight, newly formed connective-tissue membranes, which can be easily removed and under which the surface appears rough. The liver is more or less mottled, the color varying between yellow and brownish red, and its tissue is rather transparent. In the diseased places there frequently appear whitish spots of about the size and appearance of a grain of starch, which represents the remains of the normal tissue.

Howitz described this form of disease in an almost similar manner; Virchow designated it as a general hypertrophy, with induration; Wagner described it as a diffuse syphiloma of the liver. According to Wagner, on microscopic examination the interlobular connective tissue is increased in amount, and partly shows a simple hyperplasia and partly is filled with small cells and nuclei. In the interior of the acini there are groups of similar cells and nuclei generally arranged in rows corresponding to the capillaries, and sometimes apparently taking the place of the liver-cells, both nuclei and cells lying within a thin connective tissue. The liver-cells are sometimes normal, sometimes flattened, and sometimes they show the various stages of molecular destruction.

Baraensprung gives the most attention to a new formation which leads to the formation of nodules, and describes a formation of nuclei and small cells which lie partly between the elements of the liver parenchyma and partly in the walls of the bile-ducts. The liver-cells are pressed apart by this and are entirely destroyed. The walls of the bile-ducts are hypertrophied, the ducts themselves and the blood-vessels are embraced in the new formation, which passes directly into the connective tissue in the parenchyma of the liver. It appears partly in the form of larger nodules and partly as miliary granules. The larger nodules are first of a yellowish-gray or light yellow color, and show a great inclination to become changed into cicatricial connective tissue. In some cases they appear to undergo a purulent metamorphosis or to break down into detritus.

Shüppel showed that in many cases of congenital liver syphilis there was an inflammatory process of the portal vein shown by an enormous growth and cellular inflammation of the connective tissue accompanying it. In the investigation of such livers hard nodules and cords can be felt, which on section are seen to occupy the portal spaces.

The main stem of the portal vein, and sometimes the common bile-ducts, are thickened. The lumen is often so narrow that only a bristle can pass through it. The center of the nodule is caseous. Other authors described a form of liver syphilis in the shape of large nodules. Testalin has described a case in which the liver was of normal size, and in its substance several nodules could be felt, which on section represented irregular rounded tumors from the size of a hazelnut to that of a walnut. These tumors were of a grayish color, hard, elastic, and could be compared to the gummata of the acquired syphilis. Baumgarten and Gaille have described more particularly the miliary nodules. In this the liver is filled with small nodules, which are composed almost entirely of round granulation cells, and which extend into the surrounding liver parenchyma. The changes first described by Gubler are found especially in children who are born dead or who die a short time after birth. In these, the liver is increased in size and is of almost a stony hardness. Scattered through its substance there are small, rather transparent granules, which he describes as similar to small starch grains, and which he supposes represent the remains of normal liver tissue. Hutinel and Hudelo have made careful examination of the liver in a large number of cases in congenital syphilis, and they describe a variety of lesions which represent various stages of one and the same process. The lesions are not always striking to the naked eye. The size, consistency, and color of the organ may present no abnormality when there are perfectly characteristic histological lesions. It is only when the lesions are severe and far advanced that the liver has a special appearance. In general, in all cases there is some augmentation in the size of the liver, but this is not so marked as in the spleen. In the lighter cases, with but slight increase in size, the color is darker, and it is firmer than normal; it has simply the appearance of a congested liver. If this turgescence of the organ increases, it becomes large, firm, and of a violet color, and on the surface there are small points or depressions. In advanced cases the weight is still more increased, and instead of being one twenty-fifth it reaches one twentieth or even one twelfth of the body weight. There is a general tendency to a rounded form, the capsule appears to be distended, and the edges are rounded as in a fatty liver. The color of the gland differs from the normal; it is yellowish, and Gubler says approaches the color of some of the flints. The surface is smooth, and free from depressions or elevations. The consistency is increased, it is more elastic, it cannot be easily indented or torn with the fingers, and in some marked cases it creaks under the knife like scirrhus. In a great number of cases all the preceding characters are met with, but in a very attenuated degree. The organ is then not so large, and it may have almost the normal volume. The yellowish tint is only marked on the upper surface, especially in the left lobe. The consistency and elasticity are increased, but in less marked proportions. On sections the small, clear nodules may still be seen, but their recognition is more difficult.

In some cases the entire organ is not affected, but the flinty hardness and yellowish coloration appear only in small areas, more or less clearly separated from the normal parenchyma. When these areas are near the surface there are frequently slight depressions over them, and they are generally most marked about the suspensory ligament. In rare cases a true cirrhosis, with a greenish coloration and a granular surface analogous to that of common cirrhosis, has been observed. The gummatous tumors of the liver are much rarer, but we very frequently find, especially in the large flinty livers, small nodules, which Gubler has compared to bran, and which Wagner regards as embryonic gummata. They are frequently more easily seen after the tissue has been for a short time in alcohol. In some cases, in place of these miliary gummata we find larger nodules, of the size of a pea. They may be on the surface or in the parenchyma; they project slightly, have a rounded form, and can not be enucleated. The great vascular trunks are generally free from alteration. Schuppel has described, under the name of syphilitic periphlebitis, a thickening and an almost complete obliteration of the trunk and the large branches of the portal vein.

On microscopic examination the lesions can, in general, be divided into two classes, the diffuse and the nodular. The nodular form never appears alone, but in connection with it there are always diffuse lesions. The increase in size of the liver is due in great part to congestion. This may reach a very high degree, especially in the large, purplish livers, and in all the blood contents is greater than normal. Lucca thinks that there is an increase in the blood-forming power in such livers. The increased consistency of the organ is due to a general diffuse increase in the connective tissue. This is always most marked about the portal veins, and from here extends into the lobule. In general this takes rather the form of small cell infiltration. The liver-cells are obscured, and in places may be altogether displaced by this. The walls of the capillaries are thickened and the vessels themselves dilated. The liver-cells are atrophic, and in the most marked cases reduced to a small granular mass. The small granules described by Gubler are due to the presence of this granulation tissue in small circumscribed areas. The transition from such areas to the true gummata is a slight one. They always represent a later stage of the same process. The characteristic cloudiness or opacity is due to fatty degeneration and caseation of the nodule. In some cases several of the small nodules may unite in the formation of the gumma, and in this case they generally resemble the conglomerate tubercles. These lesions of the liver are the most frequent manifestations of congenital syphilis. Their frequency is probably due to the position of the liver in the fœtal circulation, where it first receives the contaminated blood from the mother. They probably form the most frequent cause of the death of the fœtus. In many cases there is no doubt that we may find lesions of the other viscera accompanying the liver alterations, but we may find the most advanced alterations of the liver without any or but slight alterations of the other viscera. Chiari examined one hundred and forty-four cases of congenital syphilis. He divides these into four classes, of which the first embraces the macerated fœtuses; the second, those who die within the first week, and in whom death was directly due to the syphilitic lesions; the third, those in whom syphilitic lesions were found, but whose death was due to other intercurrent affections; the fourth, the cases of relatively late hereditary syphilis. In the first group, embracing twenty-nine cases, in twenty-four there was diffuse syphilitic interstitial hepatitis with enlargement and increased firmness of the liver, and in two a gummatous hepatitis. In the second group, embracing forty cases, in thirty-seven the diffuse lesions were found, and in two gummata. The third group embraced seventy-one cases; of these there was diffuse interstitial hepatitis in fifty-one cases, and in three gummata. In the fourth group, the subjects dying at the ages of three, fourteen, fifteen, and eighteen years, in all the cases the coarse lobular liver was found. Of the one hundred and forty-four cases, the liver was affected in one hundred and twenty-three, or nearly nine tenths of all cases.

ACQUIRED SYPHILIS OF THE LIVER.

Lesions of the liver are much more rare in the acquired than in congenital syphilis. The anatomical character of the changes differs in different cases. Unlike the congenital syphilis, the gummatous form is most commonly met with. Virchow has made three forms—the gummatous, the fibrous interstitial, and the fibrous perihepatitis. They are frequently combined. The most recent gummata are composed of soft, reddish-gray vascular connective tissue, which is rich in young spindle-cells. When near the surface they may project, and there is little or no contraction of the tissue around them. After a time irregular yellow homogeneous dense masses appear in the centers of these. At the same time the connective tissue in the periphery loses its soft, vascular character, and becomes changed into dense, transparent cicatricial tissue. It rarely appears as a smooth investment of the yellowish central masses, but bands radiate out from it in all directions into the surrounding tissue. On section through the nodule these radiating masses of tissue are very prominent; they represent depressions, between which the masses of liver project. This is often especially apparent after immersion for a short time in alcohol. The yellowish centers represent necrotic places in which the cells and tissue have undergone coagulation necrosis. This has some similarity to the caseation of tuberculosis, but it may always be distinguished from this by its greater consistency. The difference is due to the greater admixture of connective tissue in the gumma, the caseous mass of the tubercle being composed of cells alone, while in the gumma much of the granulation tissue is converted into connective tissue before caseation takes place. The connective tissue around the caseous mass contains relatively few vessels, and in the center the vessels, as in the tubercle, are completely obliterated. The necrosis is doubtless partly due to the anæmia resulting from vascular obliteration, but it is probably due also to the necrotic action of the syphilitic virus on the tissue. After the nodule has undergone this change, further changes do not seem to take place. Softening is extremely rare, and probably most of the cases which have been reported of extensive softening of liver gummata have been due to a mistaken diagnosis. Zenker has reported a case in which numerous gummata were found in the liver of a man forty-one years old, with other manifestations of syphilis. With the exception of two, whose contents were soft and pultaceous, they had a hard, dry character, and in some a concentric lamination was plainly visible. Weber has reported a case of extensive soft gummata in the liver along with extensive syphilitic lesions in the dura mater and the lungs, but the whole account of this case, which is frequently referred to, makes it much more probable that it was not a case of syphilis, but of some malignant tumor, probably sarcoma. Maxon has reported a case in which portions of the tumors in the liver had the consistency of brain, and perforation into the hepatic duct had taken place.

Calcification of the caseous, necrotic tissue is also rare. It is possible that in some cases the necrotic material may soften, break down, and be absorbed, dense masses of connective tissue taking its place. A part of the changes in the coarsely lobular syphilitic liver may possibly be referred to healed gummata, but the general character of the tumor—its density and nonvascularity, and its being surrounded by dense cicatricial tissue, which also contains but few vessels—is not favorable for resorption.

The number of the gummata is variable; as many as fifty of various sizes have been found in a single liver. Their situation is different. They are sometimes found in or close beneath the capsule, or in the depths of the tissue. Virchow has shown that a favorite seat for them is in the neighborhood of the suspensory ligament, and thinks that slight traumas, which are due to the weight of the organ pulling on the ligament, might account for their presence here. In some cases the formation of gummata here is so extensive that the organ may be almost divided by them. Where they are near the surface there is always considerable retraction of the capsule, making deep, irregular depressions. The capsule is frequently thickened, and there are firm fibrous adhesions between the liver, the diaphragm, and other organs. These adhesions seem frequently to be the continuation of dense fibrous masses in the organ, and the gummata are often found inclosed in these (Fig. 7).

The formation of fibrous tissue is rarely limited to the neighborhood of the gummata, and there may be a general fibrous tissue formation without the presence of gummata. The liver in such cases may offer some similarity to the ordinary cirrhosis, but can be distinguished from this by the greater size and thickness of the bands of connective tissue. These extend down from the thickened capsule and intersect the organ in all directions, producing by their contraction deep depressions which divide the surface into large, irregular elevated areas. From these larger bands smaller ones which still further divide the organ are given off. Probably a more frequent change than either of these, and which may occur alone or in company both with the formation of gummata or the more diffuse interstitial changes, is the amyloid degeneration. The use of the aniline colors, rendering the detection of slight amyloid changes so much easier, has shown how frequent this change is. It is found in almost every case of gummata, and in most of the cases of diffuse lesions. In its slighter grades it affects only the walls of the arteries, but in more advanced cases it is found around the walls of all the vessels, and the entire organ may be enlarged and converted into the dense, well-known, rubberlike consistency. When the amyloid degeneration is the only or most prominent change, the organ is enlarged. Amyloid degeneration, so common in acquired syphilis, is comparatively rare in the congenital variety. In the liver syphilis of the adult the porta of the liver and the region of the great vessels is generally not affected, but in the congenital form lesions are frequently found here.

Syphilis of the liver is of special interest in the literature of the disease, because with this the study of visceral syphilis began. Gummatous tumors of internal organs have been known for a long time, but their exact nature was not understood, and they were regarded as steatomata. The first distinct appreciation of them dates from the investigations of Dittrich (1849) on the syphilitic affections of the liver. This careful

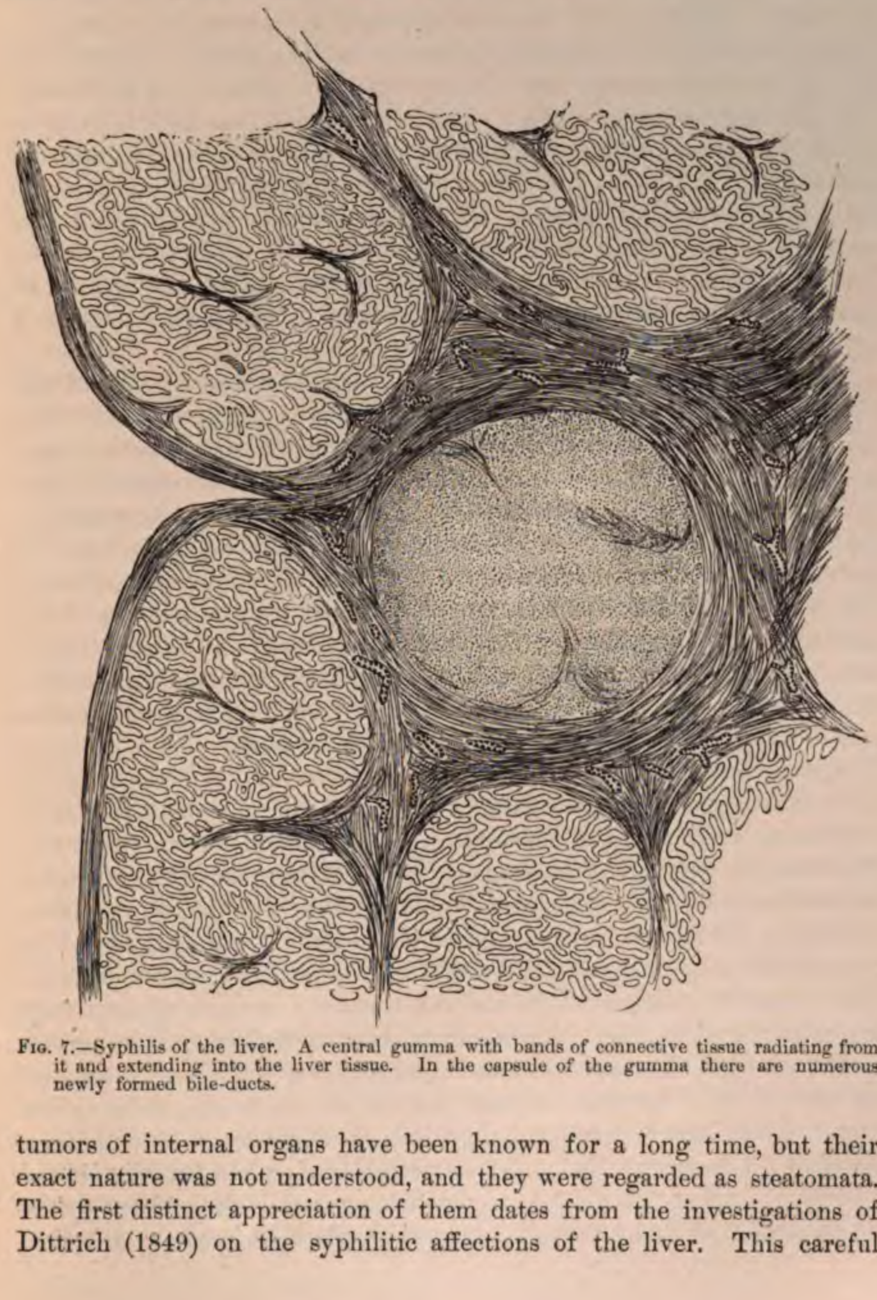

FIG. 7.—Syphilis of the liver. A central gumma with bands of connective tissue radiating from it and extending into the liver tissue. In the capsule of the gumma there are numerous newly formed bile-ducts.

observer found, in many cases of constitutional syphilis, hard, yellow, dry, solid, more or less rounded tumors in the liver. They had been observed before, but another character was assigned to them. Budd had described them as belonging to an especial category of tumors, and regarded them as due to the accumulation of caseous material in dilated bile-ducts. Oppolzer and Bochdalek described them as healed cancers. Dittrich showed their syphilitic character, and his investigations formed the basis of further study which led to important advances in our knowledge of constitutional syphilis. Dittrich, however, was greatly in error in his conception of the nature of the local process. He regarded the gummata not as tumors, and even not as new formations, but as encapsulated, unorganized exudations. He thought that in syphilis exudations could be formed which could remain in the form of dry, firm masses. The true conception of the nature of the liver gummata and of most of the lesions of constitutional syphilis dates from the classical investigations of Virchow on the whole subject.

Diagnosis and Symptoms.—The recognition of syphilis of the liver during life is attended with great difficulty. The symptoms on the part of the liver are often concealed or entirely thrown into the background by other and more manifest alterations in other organs. In a cachectic child which is covered with skin eruptions and mucous papules, the few signs that come from the liver may easily escape alteration. In such a child the examination of the abdomen should not be neglected. The most manifest symptoms in hereditary syphilis are those which depend upon the obstruction to the circulation. Lancereaux has called attention to the frequency with which hæmorrhages take place in such a condition, and says that the only evidence of syphilis may be hæmorrhage from the umbilical vessels. Bleeding from the mouth or intestines, even hæmaturia and purpura, may also be seen. Examination of the abdominal organs will show enlargement of the liver and spleen, the liver sometimes reaching to the umbilicus. The abdomen is often tympanitic. There may be very slight ascites, or it may be absent altogether; neither in the congenital nor the acquired syphilis of the liver is it a prominent symptom. Sometimes there is a collection of fluid in the iliac fossa that depends upon the peritonitis which often accompanies the liver changes. The presence of enlarged abdominal veins is not a certain sign, for they are often found in other abdominal troubles in children. During the development of the disease icterus is rare, but it is possible that many of the cases of fatal icterus of the newborn are due to liver syphilis. The course of the disease in congenital syphilis is much more rapid than in the adult. Lancereaux distinguishes two periods. In the first the disease is latent, it does not give rise to any symptoms, and is only discovered at the autopsy. In many cases recovery takes place without the affection having been diagnosticated during life, and evidences of the healed lesions are afterward found at autopsies. In the other stage the lesions are more marked, hæmorrhages take place, there is frequently some ascites, and the enlarged liver can be felt. The marasmus advances rapidly, and the other syphilitic troubles hasten the end.

The symptoms are even more indefinite in the acquired form. They are frequently so unimportant that the disease may easily be overlooked. Frerichs regards pain in the liver region as one of the most constant symptoms. This may be local, or it may extend over the entire organ. In most cases it is dull and heavy, but it may be active enough to be very oppressive. It is usually made worse by active motion. It often lasts a long time. In one of Frerichs's cases it continued without intermission for three months; in another there were intermissions lasting a week or more, with exacerbations accompanied by a slight fever. The pain is most probably always due to involvement of the capsule of the liver in the process, or to the dragging of the organs on the adhesions with the diaphragm. A second symptom is icterus. This is much more rare, and may be but slight and last a short time. Frerichs found that in one case it was due to syphilitic perihepatitis, and passed away with the subsidence of the inflammation. It was present in another case with amyloid degeneration and gummata. The autopsy showed the jaundice to be due to the pressure of enlarged glands in the porta hepatis. In a third case the jaundice was due to the obliteration of a large bile-duct by a cicatrix proceeding from the concave surface of the liver. The liver was greatly enlarged, and covered on the surface with round, painful elevations, so that at first the affection was held to be carcinoma. No pathological changes have as yet been found to account for the icterus which occurs in the secondary period of syphilis—usually in the eruption stage. Gubler was the first who attempted to prove that this form of icterus was not an accidental complication, but a characteristic symptom of syphilis, and he asserts that it appears either with the first syphilitic eruption or with the later relapses. As a rule, it is not very marked, nor does it continue any great length of time, so that we can scarcely attribute it to a compression of the gall-duct from a syphilitic cell-growth. It is more rational to look upon it, with Gubler, as a congestion icterus due to hyperæmia of the liver; or it may be regarded as a simple catarrhal jaundice, which develops under the influence of fever in the same way as the catarrh of the stomach which is sometimes present. Lancereaux alludes to the possibility of its being due to a swelling of the lymphatic glands in the transverse fissure of the liver. However, icterus at this period of syphilis may also be a matter of much more serious import.

The ordinary signs which we should expect to have from the extent of the interstitial process met with in syphilis are generally wanting. Ascites especially is not often present. It may not be present when the interstitial change is as marked as in a case of ordinary cirrhosis. This is in part due to the fact that the porta is not usually so much affected as the convex surface of the liver, and also to the greater facilities given for a collateral circulation by the adhesions of the capsule with the diaphragm. It is sometimes possible to make a differential diagnosis between the syphilitic and the ordinary form of cirrhosis by the greater pain on pressure and the rough, lobular feel of the organ. In some cases the differential diagnosis between the syphilitic liver and carcinoma may be extremely difficult, for in both the liver is painful on pressure, and the coarse lobulation of the surface may closely simulate the nodules of carcinoma. There is no single point which is diagnostic of syphilis of the liver, for anatomical changes productive of the same conditions of the organ may be found in a number of other diseases. The evidences of syphilis in other organs is of the most importance in making the diagnosis. The treatment, of course, should be antisyphilitic, and if the condition can be diagnosed in its earlier stages, while the gummata are in the granulation stage, it is possible that the disease may be arrested or even cured. In the later stages, when the gummata are converted into dense caseous, nonvascular masses, and there is a formation of dense bands of cicatricial tissue running through the organ, there can only be an expectation of arresting but not of curing the affection. This is particularly true when the cachexia has lasted long enough to allow of the formation of amyloid. Much good may be accomplished by the use of remedies with the idea of diminishing the ill consequences of the lesions which have already taken place.

VI. SYPHILIS OF THE SPLEEN.

Syphilis may be said to affect the spleen in three ways. In the first form there is a diffuse hyperplasia of the spleen, resulting in enlargement, and in which the changes appear to be only those which are common to hyperplasia of the organ found in other infectious diseases. In the second form there is a general fibrous indurated splenitis, analogous to the diffuse indurations found in the liver and other organs. In the third there is a formation of gummata. Avanzini investigated the condition of the spleen in thirty cases of syphilis in the clinic of Prof. Lang. These cases were either during the period of the primary sclerosis or of an early cutaneous syphilide. In eight out of the thirty cases he could positively determine the existence of a splenic tumor; in only one of these cases was there an immediate subsidence of the splenic tumor under the influence of the antisyphilitic treatment. Schuchter found enlargement of the spleen in six out of twenty-two cases in early syphilis: three of these had the primary sclerosis combined with a macular syphilide; the others had various early forms of the disease. Of the three cases with sclerosis in which swelling of the spleen was found, in one case the gradual development of the swelling could be distinctly observed, but in both of the other cases it was present at the first investigation. In one of the cases there was a gradual retrogression of the swelling under treatment until the normal standard was reached; in three other cases there was a gradual but slight retrogression of the swelling. Gee, in his article on Enlargement of the Spleen, found the organ enlarged in about one fourth of the cases of hereditary syphilis. He thinks the degree of splenic enlargement may be taken as a sort of index of the severity of the cachexia. The majority of the cases with great enlargement die, but sometimes such children survive; the spleen gradually diminishing in size as the health improves—not diminishing, however, *pari passu* with the improvement of the health, but remaining for a long time a monument of past cachexia. Thus the spleen can often be felt to be enlarged in children of three years old and upward, while bearing the marks of past syphilis. We have, then, sometimes an enlarged spleen as the only sign of an active syphilitic cachexia. Gee seems to have been the first to establish this connection between chronic splenic hyperplasia and congenital syphilis. The swelling of the spleen in these cases may be two or even three times the normal size. The changes found in the organ are those of a diffuse hyperplasia of the connective tissue, with induration. Similar changes in the organ are found in cases of acquired syphilis, along with other manifestations of the disease in the viscera. In all these cases it should be remembered, however, that there are probably always in congenital syphilis, extensive syphilitic lesions of the liver at the same time, and a great part of the spleen-swelling may be referred to an interstitial splenitis brought about by the chronic passive congestion. The frequency with which large amounts of pigment are formed in the large spleen speaks in favor of the probability of this view. Gummata of the spleen are relatively rare; small collections of granulation tissue are frequently found in cases of interstitial splenitis, but it is doubtful if these should be considered true gummata. There is no doubt, from the description, that a number of cases of gummata of the spleen which have been reported were old infarctions and not gummata. Gummata of the spleen must be regarded as a rare affection; the writer has seen but one instance of it. In this, an autopsy at the Johns Hopkins Hospital, along with extensive syphilis of the liver and interstitial orchitis, there was a large caseous gumma of the spleen, associated with chronic induration. Chiari found chronic spleen tumor in all his cases of congenital syphilis, with syphilitic disease of the liver. In none of these cases were there gummata found in the spleen. In none of the ninety-seven cases of acquired syphilis were any changes found in the organs which could be referred to syphilis.

VII. SYPHILIS OF THE PANCREAS.

Syphilis of the pancreas appears to be one of the rarest forms of visceral syphilis. So far the description of cases of syphilis of the pancreas has been almost entirely confined to the congenital form. In the pancreas the disease appears under two forms. The more common of these is the diffuse form; in this the organ is frequently enlarged, and much firmer and harder than normal. In other cases in which the disease has apparently lasted for a longer time the organ is contracted, its surface irregular, and its condition sclerotic. Birch Hirschfeld was one of the first to clearly describe these syphilitic changes. He found the pancreas altered in thirteen cases out of twenty-three of congenital syphilis. In general it was considerably enlarged, firm, sometimes cartilaginous; on section, white and refractive and more or less homogeneous, the acinous structure being very much obscured. Cruveilhier compares the tissue of the indurated pancreas with a carcinoma of the mamma. Corresponding to this, the microscopic investigation shows a marked growth of the interstitial tissue, which is found not only in the tissue between the great lobes of the gland, but also homogeneously distributed through the gland, compressing the single small acini. The epithelium in such places is in a high degree atrophic. In many cases only the head of the pancreas shows such induration. Huber and Hecker have described similar cases. In adults the same condition of interstitial pancreatitis is also found in rare cases, but up to the present no definite connection between this and syphilis has been established. Beck and Chiari have described an interesting case of pancreatic combined with liver syphilis. In this case—an infant born dead, with extensive syphilis of bones and skin—the pancreas was much enlarged and of an almost cartilaginous consistency. Instead of the normal glandular parenchyma, the chief constituent was a fibrous connective tissue tolerably rich in cells. There were also scattered through the organ small miliary foci which could be regarded as miliary gummata, and which were partly arranged in groups and partly scattered through the gland. In some of the larger of these a slight caseation in the center could be made out. They were most numerous around the duct, especially in the head of the gland and in the wall of the portion of the common bile-duct which is inclosed in the gland. The wall of the common bile-duct in its whole course was thickened by an abundant cellular infiltration and the deposit of miliary gummata. The connective tissue extended along the bile-duct and the portal vein into the liver and followed the ramifications of these throughout the organ. The gummata of the pancreas are relatively more rare than the diffuse form. They appear in the form of very small miliary nodules, which are generally composed largely of granulation cells with or without slight central caseation, and may be found distributed in all parts of the glands. In a few cases large gummata, with extensive caseations taking up almost the entire extent of the gland, have been described. In one hundred and forty-four cases of congenital syphilis Chiari found syphilis of the pancreas in eight cases. Five of the eight cases showed gummata, the others the diffuse form. In ninety-seven cases of acquired syphilis the pancreas was not affected a single time. Nothing is known about the symptomatology of the disease, either in the congenital or in the rare cases of acquired syphilis. So far syphilis of the pancreas may be considered to be of only pathological interest. Most of the writers on diseases of the pancreas make little or no mention of syphilis.

VIII. SYPHILIS OF THE SUPRARENAL CAPSULES.

The suprarenal capsules appear to be, comparatively speaking, immune from syphilitic lesions. They enjoy the same immunity to this that they do to most of the other infections in the body. Their immunity may possibly be due to the fact that they lie out of the reach of lymphatic influence, but it may also be due to the tissue in some way not affording a favorable place for the development of the syphilitic lesions. We have seen but one case in which the suprarenal glands were affected. This was in a man forty-five years old, with extensive syphilitic lesions of the lymph glands. There were distinct gummatous nodules in the entire chain of the post-mesenteric lymph glands. The lymph glands were enlarged and indurated where distinct gummata were not found in them. In each of the suprarenal capsules there were small, hard tumors of the general character and appearance of gummata. In the right suprarenal capsule the most advanced lesions were found. In this gland in the medullary portion there was a hard, firm tumor mass, which on section seemed to be composed of a whitish, opaque, central portion, and a transparent pearly-gray periphery. The degenerated central portion was sharply circumscribed. From the peripheral portion there were radiating masses of connective tissue extending out into the surrounding tissue. In the left gland there was a similar though very much smaller mass. On microscopic examination of the gland the nodules gave all the characteristics of gummata. The central portion was composed of a dense, necrotic tissue, consisting of broken-down cells and connective tissue. In the periphery, and separated from the center by a sharp line of demarcation, there was a dense connective-tissue capsule, with comparatively few cells. In a case like this there was a probability of the nodules being tubercles, because these large fibrous tubercles are particularly apt to be formed in the suprarenal glands. The examination of the tissues and the absence of tubercle bacilli clearly excluded the possibility of tuberculosis. There were no symptoms whatever of Addison's disease, nor were the lesions in the glands so extensive that we should have expected it, only a small portion of each gland being destroyed. Cases, however, do occur in which syphilis of the suprarenal glands may be associated with Addison's disease. Such a case has been reported by Beaven, and occurred in a Hindoo. In this case the suprarenal capsules were almost entirely destroyed. Clinically, we do not think that this affection would have any importance. There is no way by which it can be recognized and separated from tuberculosis. Should Addison's disease develop in a subject with well-marked syphilis elsewhere, it might be justifiable to institute a course of antisyphilitic treatment.

SYPHILITIC AFFECTIONS OF THE RECTUM AND ANUS.

By JAMES P. TUTTLE, M. D.

The course of syphilis in and about the rectum and anus varies from that elsewhere in the body, only so far as it is influenced by the anatomy and functions of the parts. The initial, the secondary, and tertiary lesions are here seen, not with equal frequency, it is true, but sufficiently often to justify us in considering them possibilities in any case of obscure rectal disease.

An initial lesion about the anus in men is strong presumptive evidence of pederasty, and when inside of the rectum in either sex it is positive proof of such unnatural intercourse. In women, the lesion at the anus may be due to accidental contact of the male organ, or to the virus being carried by a leucorrhœal discharge from the vagina into a fissure of the part, but in man there is no such probability.

Chancre.—The proportionate frequency of chancres of the rectum and anus will never be determined, owing to the fact that their painlessness, lack of purulent discharge, and tendency to spontaneous cure cause the large majority of them to be overlooked. Within the rectum proper the initial lesion is most rarely seen. Ricord, Fournier, Vidal de Cassis, have each reported a single case; and of these, Mollière (Maladies du Rectum et de l'Anus, 636) only credits one, that of Fournier. Martineau (Leçons sur les Deform., vulvar et anal., pp. 162, 174–176) has reported three cases—one above the internal sphincter, one on its level, and one between the two sphincters.

At the anus the lesion is more frequent. Feulard (Ann. de Dermat. et Syph., 1892, p. 805) observed four cases, three in men and one in a woman, among seventy-five extra-genital chancres.

Clerc, Bassereau, and Fournier saw seven chancres of the anus in twelve hundred and thirty-seven cases of the disease elsewhere in men. Peau and Malassez (Étude sur les Ulcères anales) say it forms one in a hundred and seventy-seven cases in men, and one in thirteen cases in women. Martin and Carrier saw fourteen chancres of the anus in one hundred and seventy-five cases in women, while Jullien observed twenty-one of the anus and perinæum and four of the buttocks in eighty-two cases in the same sex. The last-named observer did not distinguish between the anus and perinæum, and therefore his figures can not be taken into account in estimating the frequency of the disease in these parts. It will be seen, however, that the lesion is much more frequent in women than in men, occurring about once in fourteen cases in the former, and once in one hundred and eighty cases in the latter.

Within the rectum the chancre may appear as a mere abrasion or erosion; as a round, indurated ulcer with clean-cut, elevated borders, little undermined and almost dry; or as a brownish, indurated papule. The period of incubation is said by Mollière (ibid., p. 634) to be quite long—a statement which is in harmony with the supposed resistance of the mucous membrane of this part to the venereal virus. The induration may be very slight or extreme, filling the rectum and producing stricture, as in Vidal's case. At the anus the lesion assumes various disguises. It is most frequently seen in the form of a fissure between the radiating folds. Here it is usually of some depth; the edges are indurated and clearly defined. It secretes little pus and is generally painless. Were this symptom constant the diagnosis would not be difficult, but occasionally cases are seen which are intensely painful.

The induration and very slight discharge are the only distinctive features. They occur more frequently upon the anterior border than upon the sides or posterior border. Sometimes the lesion occurs about the margin of the anus as an erosion or ecthyma, and spreads over considerable surface. Mollière (*op. cit.*, p. 639) says that these are not the original lesions but secondary manifestations due to "transformation *in situ*" of the chancre and its induration. They do not itch or burn, but show a tendency to contract and heal rather than to progress. When it occurs upon the muco-cutaneous surface just outside of the anus, the chancre usually appears as a round, indurated dark brownish-red ulcer; it is painless and indolent, secreting little pus and healing very slowly. Again, the anal chancre may appear as an elevated papule resembling condyloma acuminatum. The induration and absence of fetid discharge will serve to distinguish it.

After two to three weeks chancres of the anus usually heal, the only trace they leave being a slight induration of the parts. Unless secondary manifestations appear very early, the slight irritation about the part may entirely escape the patient's memory, and it will be almost impossible to determine the point of entrance of the virus into the system, for there is scarcely any cicatrix or contraction following chancre of the anus. I have seen one case of secondary syphilis of the rectum and anus in which I could distinctly outline the chancrous induration just above and within the border of the external sphincter. According to the patient, the lesion was caused by falling astride a clothes-line. There were unmistakable constitutional symptoms, however, and mercury cured his "rope-burn."

When complicated by chancroid, chancres take on the nature of the local disease, and may even become phagedenic. Nevertheless, the poisons do not neutralize one another, and systemic infection follows just as surely.

Secondary Syphilis.—Acute secondary manifestations of syphilis within the rectum are rare, but about the anus they are very frequent, and follow more or less closely those of the disease elsewhere. From two to eight weeks after the initial lesion there appears an erythema or erosion about the anus and between the folds of the buttocks. This may be seen sometimes even before the chancre has healed. The latter may pass imperceptibly into the former, thus occasioning the transformation *in situ* to which I have before referred. This manifestation corresponds with the macular eruption on the trunk, and in fleshy people it occurs quite constantly. It appears first as a dull red zone about the anus, which gradually fades into the surrounding skin. As the disease progresses the redness brightens, the epithelium becomes macerated and rubbed off by friction, and the entire erythema becomes an erosion. There are more or less cellular infiltration and thickening of the parts, and the condition may be easily mistaken for an acute eczema. There is little itching or pain, however; the discharge is scanty and purulent, and the thickening is greater than usually occurs with eczema.

Following this condition, and sometimes ingrafted upon it, we find the most frequent lesion of secondary syphilis of these parts, the so-called *mucous patches.* They occur in various forms, are generally associated with similar manifestations about the mouth and fauces, and correspond to the copper-colored syphilides upon the body. They are due to cellular infiltration and inflammatory changes in the epidermis and corium. The epidermis becomes macerated, and they secrete an irritating fetid fluid.

The principal varieties of mucous patches about the anus and rectum are:

1. The small red papules.
2. The fissure-like cracks.
3. The small, round, gray patches.
4. The "plaque porcelanique."
5. The elevated or vegetating patches.

The small red papules occur early in the disease. They are slightly elevated and generally multiple. Their seat is usually upon the mucous membrane itself, but they are also seen upon the muco-cutaneous and cutaneous surfaces. These little papules soon break down, and produce erosions or small ulcers. If they occur between the radiating folds they leave the second form of mucous patches—the

Fissure-like cracks. These frequently follow the small red papules, but are not necessarily dependent upon them. They consist in small cracks in the mucous membrane between the anal folds, covered with a grayish pellicle or sodden granulation. There is no induration about their bases, although their edges are slightly elevated, and when they heal they leave no cicatrix; consequently they can never produce stricture of the anus. They are said by some to be painless, but one has only to see a few of these cases to have his mind disabused of any such misconception. When they involve the folds at the muco-cutaneous border they are quite as painful as other fissures. They resemble simple fissure so closely that they can only be distinguished, and that with difficulty, by their color, raised edges, and the history of the case. In the later stages of constitutional syphilis there sometimes develops a dry and brittle condition of the mucous membrane of the anus. Under these circumstances there are constantly occurring little fissures which are almost painless, without elevated edges, and frequently sluggish, with pale granulations. They should not be mistaken for the mucous patches observed in the early secondary. This tertiary condition is sometimes very annoying on account of the itching—a symptom which is not present in mucous patches. The history of the case, the presence of other secondary manifestations, and the fact that these patches are usually multiple, will serve to distinguish them from chancre.

The small round gray patches occur upon the muco-cutaneous and cutaneous surfaces just without the anus. They are generally multiple, not elevated, and almost dry. In those that I have seen there has been a certain amount of thickening about their bases, so that the skin was not supple as in the other varieties. Hence I am inclined to regard them as ulcerative syphilides. Under the influence of treatment they dry up, drop off a black eschar, and leave a white depressed cicatrix, and this again points to their ulcerative character.

The plaque porcelanique consists in a large, round, elevated patch situated upon a supple base of nonindurated skin. Its color is pearl-white, its surface is smooth and moist, and there is seldom more than one of them about the same anus. They are attached to the skin by a broad flat base, wider than their summit, and, though the skin is supple, there is some redness and inflammation about the attachment.

The elevated mucous patch occurs as a papular eruption, adhering by a broad base to the skin, which is more or less inflamed and thickened. This may be the result of the preceding variety, or it may possibly develop as a small white mucous patch, which proceeds to extend in all directions. I doubt this, however, believing, as said above, that these small round patches are ulcerations. Its surface is lobular, but the sulci between the lobes are very shallow. It secretes an abundant fetid fluid, which bathes and irritates the parts around and below it. This fluid may irritate the papillæ over which the patch is situated and cause them to hypertrophy. When such takes place, the branching papillæ shoot upward, their vessels multiply and dilate, the summit of the growth increases in width while the base remains the same, and there is developed the cauliflower-growth, distinguished as vegetating mucous patches, venereal warts, or condylomata lata. This is then no longer a simple mucous patch, but a combined growth, a papillomatous wart, upon the surface of which there may be a syphilide, but which in its nature is not entirely syphilitic, and which yields not in the least to syphilitic medication. These are the growths which first led to the application of the term *condyloma* to syphilitic manifestations; they are associated with the disease but not a part of it. Kelsey says, "The secretion from these growths is in the highest degree infectious, and is also auto-inoculable." This latter fact alone would prove their nonsyphilitic nature.

How frequently mucous patches occur inside of the rectum it is impossible to tell, since they produce no symptoms calling attention to them. Mollière (p. 641) has reported one case of the small white patch five centimetres above the anus, and I have recently seen what appeared to be a small red papule about one inch above the external sphincter. Had the patient not had other evidences of syphilis, I should have had no occasion to suspect the nature of this growth. It yielded, however, to antisyphilitic measures. There is no anatomical or physiological reason why the rectum should not be as frequently the seat of mucous patches as the mouth or fauces, and it is the opinion of the best authors that wider experience and more accurate observation will prove such to be the case.

Secondary Syphilitic Ulceration.—Mucous patches may ulcerate and leave ragged ulcers about the anus and between the folds, such as the French call "rhagades." When these heal they may leave around the anal margin hypertrophied, crenated folds of skin resembling somewhat a cock's comb. The French writers consider this condition as pathognomonic of syphilitic infection. Sir James Paget says of it, "I will not venture to assert that these cutaneous growths are never found except in syphilitic disease of the rectum, but they are very common in association with it, and so rare without it, that I have not seen a case in which they existed, either alone or with any other disease than syphilis" (Medical Times and Gazette, vi, p. 280). I have certainly seen two or three such cases in which there was not the slightest ground to suspect syphilis. "It has been assumed rather than proved," says Kelsey, "that a mucous patch in the rectal pouch may become the cause of destructive ulceration, subsequent cicatrization, and hence of stricture so-called syphilitic"; but, as he goes on to say, this has never been verified by clinical experience, nor is it necessary thus to account for the extensive ulcerations and strictures of secondary syphilis. "Where a constitutional syphilis exists, but without any positive evidence of the disease, an abrasion or localized inflammation may take on the characteristics of syphilitic ulceration, and healing, leave a characteristic syphilitic cicatrix, smooth, white, depressed, and pigmented at its borders" (Tarnowsky, Arch. f. Dermatol., 1879, p. 82). The rectum and anus are subject not only to such abrasions, but also to extensive ulcerations following slight injuries in comparatively healthy people. How much more liable are they, then, to undergo this process when the specific dyscrasia exists!

But one may say these are only the results of traumatism in degraded tissues, and not true manifestations of secondary syphilis. Do we not, then, have true secondary ulcers of these organs? As to the anus there has never been any question of this, nor should there be with regard to the rectum. The march of syphilis is so irregular that it is impossible to set a time limit to any of its manifestations. In rapidly progressing cases the tertiary symptoms may appear within a few months of the initial lesion, while in others the secondary manifestations may occur after some years. I have recently seen a typical mucous patch appear in a patient nearly four years after his infection, and, as ulcerative syphilides are later manifestations, it is reasonable to suppose that they may occur at even remoter periods. Moreover, the symptoms fade so imperceptibly into one another that it is impossible to draw the line either by time or clinical signs where the secondary ceases and the tertiary begins. It is better, therefore, to limit the tertiary ulcerations of the rectum to those which are the sequence of gummata and syphilitic strictures. We may then understand secondary to mean all those due to syphilis, but not sequences of the above conditions. With this interpretation there is no more doubt of syphilitic ulceration of the rectal ampulla than of that of the nose, trachea, or fauces.

"When we consider," says Van Buren, "how rarely the rectum is carefully explored, except when painful symptoms render this measure necessary, and that secondary eruptions are usually painless, the absence of recorded cases of secondary ulceration is not difficult to understand; while the common occurrence of secondary syphilitic manifestations at the other end of the alimentary canal—in the mouth and throat—justifies the assumption that they also occur, if not so frequently, in the rectum" (*op. cit.*, p. 243).

Allingham says that in ninety-nine cases of rectal ulceration and stricture over fifty per cent were the subjects of undoubted constitutional syphilis (*op. cit.*, 1871, p. 241).

R. W. Taylor has reported two cases (Jour. Cut. and Vener. Dis., 1886, p. 424), and Mollière and Fournier (*op. cit.*) speak positively of the nature of these ulcerations. McLaren reports a most interesting case (Edinburgh Clin. and Path. Jour., 1883–'84, p. 625) in which the symptoms of ulceration began nine years after the initial lesion. He saw the patient six years later, and then there were tertiary symptoms as well as secondary upon his person. Curling (Dis. of Rect., p. 112) and Avery (Trans. Path. Soc., London, vol. i, p. 94) both describe it, and almost every modern syphilographer acknowledges its probability, although few of them have studied the rectal manifestations sufficiently to describe them.

The ulcerative lesion occurs more frequently about the anus than in the rectum. Here they are early features of the disease, occurring frequently with or about the time of fading of the secondary rashes. They begin first as a sort of local inflammatory effusion; as the cellular infiltration occurs they harden, contract, and break down, leaving irregular, elongated, elevated, and indurated bright-red or grayish ulcers, which bleed easily upon touch, but which are comparatively painless. They are usually multiple, their edges are not undermined, and the intervening integument seems perfectly healthy. Their seat is generally upon the verge of the anus, or between the radial folds, where they appear as small, fissurelike cracks. The folds themselves present a gray, sodden appearance, and all the parts are bathed in a thin, fetid secretion. These ulcers are not painless, and without other evidence of syphilis it is almost impossible to diagnose them from simple fissures. Their multiplicity, distinct borders, induration, and the sodden appearance of the folds, will serve to distinguish them.

Syphilitic anal ulcers are usually chronic and stationary, but occasionally they are acute and progressively destructive. Dr. Cripps (*op. cit.*, p. 197) reports an interesting case of this. The patient was a woman in whom, at the first examination, he found a superficial crack at one point only between the anal folds. Ten days later several other angry-looking fissures had developed, and the original ulcer had extended some distance into the rectum and occasioned two alarming hæmorrhages. The patient died shortly afterward of Bright's disease, and doubtless this was the cause of the destructive course of the ulceration.

Inside of the rectum the ulcers occur at a later period, the secondo-tertiary. The same cellular infiltration of the mucous membrane takes place, and from friction or necrosis it breaks down at more or less numerous points. Here the ulcers are circular, with clearly cut, indurated edges, never undermined, and rarely extending in their early stages deeper than the submucous tissue. If recognized and treated at this stage they disappear, leaving behind no cicatrices or contractions; but, unfortunately, they present so few symptoms at this period that we rarely observe them until they have progressed to the chronic stage. At this time they are characterized by a noticeable loss of tissue; the mucous membrane, the subcutaneous tissue, and the muscular wall of the gut are destroyed in their entire thickness, and the sacrum itself may be laid bare. If they are situated upon the anterior or lateral wall of the rectum they may perforate the peritonæum (Mollière, *op. cit.*, pp. 642, 643). They are surrounded by inflammatory zones, and hypertrophied glands may be felt as nodosities beneath the mucous membrane. They sometimes spread and encircle the rectum and become fungoid (Kelsey, *op. cit.*, p. 335); but in such cases they are generally associated with some other disease, producing malnutrition, such as Bright's disease, tuberculosis, etc. These ulcers are situated throughout the rectum and colon, but grow less numerous as we follow the bowel upward. Their favorite seat is in the lower portion of the rectum, about one inch above the sphincter.

The points of distinction between them and tuberculous ulcers are well outlined by Sir James Paget (Med. Times and Gazette, 1865, vol. i, p. 279): "They are regular, with sharp, even, well-defined edges, with level bases; they are not excavating, nor do they extend through the submucous tissue; their edges are nowhere eroded or undermined, sinuous, thickened, brawny, or infiltrated; the subjacent tissues appear healthy, except at the rectum. These ulcers are not grouped, and where by extension or coalescence they have lost their first shapes, they have acquired one altogether irregular, and have in no instance even tended toward that girdlelike shape, encircling the canal of the intestines, which is so characteristic in the large coalesced tuberculous ulcer." Notwithstanding the dictum of so high an authority, these ulcers do sometimes involve the entire thickness of the rectal wall, and we have it from good observers that they do sometimes encircle the rectum. I have myself seen a case of secondary syphilitic ulceration of the rectum where the ulcer had extended circularly half around the rectum and through the recto-vaginal wall, producing fistula, and yet there was scarcely any appreciable contraction of the caliber of the gut.

Local tuberculous ulcers are single, deep, with eroded, undermined edges, and not surrounded by any inflammatory zone. General tuberculous ulcers of the rectum are always associated with tubercular disease elsewhere in the body. They are multiple, small at first, with undermined edges, and between them, just beneath the mucous membrane, may be felt small, millet seedlike nodules of tubercular deposit. They increase in number rather than decrease as we follow the rectum upward, and the purulent secretion is much more abundant than in syphilitic ulceration. Even where they have coalesced and encircled the rectum the walls of the latter remain supple and without thickening. Where syphilitic ulceration has existed for some time and involved any considerable portion of the rectum, the walls become thickened, leathery, and stiff. Thus we have both positive and negative phenomena for differentiating these diseases. Among the early symptoms of syphilitic ulceration of the rectum are a feeling of weight about the sacrum, and diarrhœa. The latter is peculiar. The patient on rising in the morning has a sudden desire to defecate. Upon going to the stool he passes only a small amount of pus and mucus.

Later on he may have a natural movement, and at various times during the day he will be called to the closet, only to repeat his early morning experience. If the ulceration involves the muco-cutaneous border, each of these calls may be followed by a dull aching or acute pain of simple ulceration or fissure. In the later stages the pus becomes more abundant and dribbles through the sphincter, causing skin-tabs, condylomata acuminata, and excoriations. These are all the result of the irritating discharge, and may be produced by gonorrhœal, chancroidal, tuberculous, or any other form of rectal ulceration. The amount of constriction associated with these ulcerations varies from the slight narrowing of the canal, due to congestion and inflammation of the walls, to that of absolute occlusion, due to cicatricial contraction or neoplastic deposit. The stricture from secondary ulceration is usually narrow and fibrous, and may not be at the seat of the ulcer at all, but along the edge of the levator-ani muscle. In this case it is due to atrophy and contraction of this muscle, brought about by the irritation of the ulcer, according to Cripps.

Gummata.—These tertiary manifestations may occur in any organ of the body in which there is connective tissue. The rectum is no exception to this rule. No specific or course of treatment has ever been devised which can insure against the possibility of gummata following any given case of syphilis. Esmarch (Pitha and Billroth, Handbuch, Erlangen, 1872), Fournier (*op. cit.*), Bumstead and Taylor (*op. cit.*, p. 607), Zappula (Arch. f. Derm. und Syph., Prague, 1871, p. 62), Ball (The Rectum and Anus, p. 225), and many others, have reported cases of localized gummata in the rectum. One of the most interesting is that described by Zappula and quoted by Ball (*op. cit.*, p. 183). The patient had an ulcer on the glans penis fifteen years previously. Mercurial treatment had been at once adopted, and no secondary symptoms had appeared. Shortly before he was seen by Zappula he began to suffer from pain about the right side of the anus and the tuberosity of the ischium; very soon afterward the symptoms of rectal stricture occurred and fecal impaction resulted. Rectal examination showed smooth, elastic elevations, which appeared to be folds of mucous membrane. At about four centimetres from the anus there was found a painless swelling the size of a hazelnut, globular, smooth, and elastic; it was just beneath the mucous membrane, but not attached to it. Evidently there must have been other and larger deposits above, for the one described could not have produced the obstruction. The symptoms, however, all disappeared under the administration of iodide of potassium. Mollière has reported a similar case (*op. cit.*, p. 645). These neoplasms are rarely seen about the anus, except following ulcerations extending to this part from another, and in the condition described by Fournier as ano-rectal syphiloma. In the rectum they are comparatively frequent, thus reversing the order of the earlier syphilides. They are globular, elastic, cellular deposits in the submucous tissue. In their early stages they are not attached to either the mucous or muscular wall of the gut, but later on they may involve both. They may be simple or multiple, small or of large proportions. They are generally localized, but may be diffused and occupy considerable of the circumference of the rectum. Kelsey says these diffuse gummata are what Fournier has described as ano-rectal syphiloma. This is not the case, however, in my opinion, for the disease described by Fournier, as we shall see later, involves the whole circumference of the rectum, and these diffused gummata do not; they may spread along the axis of the gut, and not circularly at all. Moreover, their nature is distinctly gummatous and not fibrous, as is the case in ano-rectal syphiloma. There is no inflammatory zone about them, but a deposit of fibrous tissue, which increases until it encroaches seriously upon the caliber of the gut. Mollière says they do not suppurate, but undergo a sort of fatty or cheesy degeneration, and thus break down—a statement which has not been verified by other observers. Mathews (Dis. Rect. and Anus, 1892, New York) thinks most of the venereal ulcers of the rectum are due to the breaking down of gummata.

R. W. Taylor has reported four cases of such ulcers (Jour. Cut. and Vener. Dis., New York, 1886, p. 226), one of which was situated in the recto-vaginal septum, had ulcerated through and formed a recto-vaginal fistula. It is possible that gummata may become so numerous and so large as to occlude the rectal caliber, as in the case of Zappula, but certainly this is very rare. When they ulcerate, however, there is considerable destruction of tissue in the deeper layers of the gut wall, an increase in the fibrous deposit about them, and upon healing they leave a white, elevated, and contracting cicatrix, which invariably causes more or less stricture of the rectum. I do not doubt that a stricture of large caliber may be produced by the deposit of fibrous tissue in the inflammatory zone about a gumma, and the latter never ulcerates owing to its coming under treatment in time to prevent this; but in such cases the deposit will be absorbed and the stricture disappear under the same treatment. Permanent stricture following gummata of the rectum are almost invariably due to ulceration of the neoplasm, and may, I believe, be prevented if seen before this ulceration takes place.

Ano-Rectal Syphiloma.—This term has been applied by Fournier (Lesions Tertiares de l'Anus et Rectum, Paris, 1875) to one of the late manifestations of syphilis. It consists in a specific fibrous infiltration of the rectal wall. He says that it begins in the submucous tissue, and that ulceration of the mucous membrane is a secondary result of the condition, not a part of it. It is essentially a hyperplastic proctitis, tending to a sclerotic stage, such as is seen in the kidneys, liver, and other organs in late syphilis. We distinguish it by the stiff, mammillated, ridgy feel of the rectum, without ulceration, and generally associated with hyperplastic exudation about the anus. Diagnosis between this and inflammatory deposit is very difficult where no concurrent syphilitic symptoms exist. Its essential phenomenon is that of contraction. Fournier says if "not treated, the rectal syphiloma persists from the beginning; not only persists, but is aggravated and degenerated; it becomes fibrous, and, still more, it retracts itself. Here is the essential, redoubtable phenomenon upon which will depend all the ulterior evolution of this curious pathological process. It contracts, and why? In virtue of the tendency of fibrous tissue, comparable in this to the inodular tissue, to retract without cessation upon itself. The consequence, quite natural, of this progressive retraction is to diminish the caliber of the intestine" (France Médical, October 31, 1874). It is generally due to acquired syphilis, but Ball has reported a case in a boy, ten years, suffering from congenital disease (*op. cit.*, p. 184). Van Harlingen (Internat. Encyc. Surgery, vol. ii, p. 519) says the disease rarely extends beyond two and a half inches from the anus, and neither gives pain nor inconvenience in its early stages. This limitation of the disease is not acquiesced in by other observers. Van Buren and Kelsey, as noted above, consider it a form of diffuse or infiltrated gumma. So also does Maclaren, who reports an interesting case of the disease (*op. cit.*, p. 875). His own microscopic report, however, disproves this, for he says, "The tumors were composed of *dense fibrous tissue*, sparingly supplied with blood-vessels"—a condition not seen in gummata. No specifics were used in this case. Diet, lavage, and local treatment cured the ulceration, while dilatation made the stricture supportable. The weight of authority and the cases reported prove, I believe, that Fournier was right when he described this as a distinct and separate late manifestation of syphilis, independent of and not necessarily associated with any other feature of the disease. In its early stages this form of syphilitic disease presents no symptoms which call either the patient's or the physician's attention to it unless there be some perineal hyperplasia such as I have mentioned above. There is no pain, diarrhœa, or obstruction until it has progressed to considerable thickening of the wall, when the patient will notice difficulty in voiding fecal masses of any size. Nevertheless, those cases in which an early digital examination is made show a thickened, leathery, inelastic condition of the rectal wall, more or less nodular, and extending usually three to five inches upward from the anus. After the contraction has proceeded to some degree, extensive ulceration of the mucous membrane takes place. This ulceration is shallow, and involves the mucous membrane far above the strictured portion. It is due to abrasion in a syphilitic diathesis. It secretes abundant pus, and bleeds easily upon touch or movement of the bowels. The patient complains of constant diarrhœa and a sense of heat and burning in the rectum like that of dysentery. The ulceration itself closely resembles that of Bright's disease, and can only be distinguished by the infiltrated, thickened condition of the rectal walls, and by the absence of nephritic symptoms.

Rectitis Proliferante Syphilitique.—Under this title Dr. Paul Hamonic (Annal. Med. Chir. Trans. France et Etrang., 1886, ii, p. 3 *et seq.*) has described a condition which he considers a peculiar syphilide. It consists in a villous growth upon the mucous membrane of the rectum. Its characteristics are villous prolongations, fragility, and feeble resistance of the covering membrane. The tumors fill up the rectum but do not tend to form stricture, and the mucous membrane above them is perfectly healthy. I have not observed any such disease. The case described by Kelsey (*op. cit.*, p. 335) might be one of this kind. From a careful study of the paper, however, I am inclined to consider the condition nothing more than simple vegetations, condylomata acuminata, due to the irritating discharges of syphilitic or nonsyphilitic ulceration of the rectum.

STRICTURE OF THE RECTUM.

The so-called syphilitic stricture of the rectum has so long been recognized that it is useless to consume space in arguing for its entity. There is no longer a question of its existence but of its nature. Some authors and many practitioners go so far as to assume constitutional syphilitic infection in all cases of nonmalignant stricture of the rectum, while others hold that it is never a constitutional affection, but the result of a local condition either ulcerous, chancrous, or chancroidal.

Rectal stricture is the result of various conditions, and I would here record my belief that it is dual in its nature and may be produced by any of the venereal affections of the part. It is not just to a pure woman to pronounce her syphilitic because she has a nonmalignant stricture of the rectum; neither should we lightly conclude that a given stricture is nonsyphilitic because there are no patent evidences of the disease elsewhere. I have already quoted the positive assertion of Van Buren, that he has seen chancroidal ulceration followed immediately by stricture of the rectum. Gosselin (Arch. gén. de Méd., tome iv, p. 667) says it is the result of cicatrization of chancroids extending up into the rectum that most frequently produces stricture. Mason has reported thirty-one cases to prove that all these strictures are chancroidal and not syphilitic, but his own table proves the dual source of the condition, as fifteen of the thirty-one cases were syphilitic. Van Harlingen, a close and accurate observer, says (*op. cit.*, p. 518), "Many of the so-called syphilitic strictures of the rectum are, in reality, nothing more than the contraction of chancroidal ulcers." Cripps believes that it is a potent factor in the production of stricture; not through the cicatricial contraction which follows, but through the spasm, contraction, and atrophy of the levator-ani and circular muscular fibers consequent upon its irritation. I myself have seen one stricture of the rectum follow a simple sore just within the anus. It is no doubt, however, very rare, for the ulceration must be deep, extensive, and have a large amount of inflammatory deposit about it to produce such a result. Simple ulceration of the mucous membrane does not leave a cicatrix upon healing. Hence, in chancroid, the deeper tissue must be destroyed to produce a stricture, and it is seldom that such is the case except in phagedenic ulcerations. On the other hand, the evidence of stricture as the result of syphilis is overwhelming. Rectal specialists almost universally find that about fifty per cent of cases of nonmalignant stricture of the rectum have a near or remote venereal history. Cripps does not believe it is so frequent a cause, since strictures are so much more frequently seen in women than in men, while the reverse is true with regard to syphilis. The other rectal manifestations of syphilis are, however, much more frequent in women than in men; moreover, in the latter, the disease is nearly always earlier treated than in the former, and as stricture is generally a late manifestation it is thus prevented.

As to the form under which syphilitic stricture of the rectum occurs there is a wide difference of opinion. Barduzzi (Giorn. Ital. d. Mal. Vener., No. 1, 1875) holds that stricture may result from the early primary and secondary lesions of syphilis. Mollière (*op. cit.*, p. 278), says that "stricture of the rectum in syphilitic subjects does not recognize true chancre as a cause," and that the case reported by Ricardo was evidently a dual sore. He admits (p. 280) stricture as the result of secondary syphilitic ulcerations of the rectum, but says they are of little extent and susceptible to the action of antisyphilitic medication. Fournier holds that stricture of secondary syphilis is due to ulceration of mucous patches, but, as we have seen, these patches rarely occur high enough to account for stricture at this stage.

All authorities who recognize syphilis as a cause of stricture agree that in the tertiary period it may result from ulceration of gummata and the consequent deposit of fibrous material about them. Of the ano-rectal syphiloma of Fournier and its influence in producing stricture I have already spoken. Trélat describes a category of symptoms producing syphilitic stricture which he calls quaternary (Prog. Médical, 1878, p. 473). He says the stricture is due to interstitial deposit in the muscular wall of the gut and not to cicatricial contraction. Of this condition Mollière says (*op. cit.*, p. 282): "They are the most formidable of all, on account of their large extent, which places them absolutely beyond the resources of art. In such cases the interstitial tissue of the muscle is replaced by a connective tissue, which scleroses and destroys by atrophy the muscular fibers." In the other forms of stricture of the rectum the deposit is in the mucous or submucous cellular tissue, but here it is in the muscle itself, and where it is well established the damage is irreparable.

We may thus, it appears, have stricture of the rectum from chancroid, chancre possibly, secondary ulceration, gummatous infiltration, ano-rectal syphiloma, and, according to Trélat, to quaternary infiltration of the muscles. As the different varieties are susceptible to treatment in a markedly different degree, it is most important to distinguish them.

Pathology.—The most complete pathological study of these strictures is that given by Mallassez (Dict. Encyclyp., p. 728), which is confirmed by Cornil (Leçons sur la Syph., p. 412), and Panas and Valtat (Bull. de la Soc. Chir., Paris, 1872, pp. 543 and 572). He says: "The contractures presented all the characteristics of strictures called syphilitic of the lower end of the rectum. The lesions which presented ought to be distinguished as lesions above the stricture, lesions on a level with the contracted portion, and lesions below the stricture. Above the stricture one saw an ulceration having a variable height, and not presenting any trace of mucous membrane, but instead of this some embryonic tissue. At the upper limit of this ulceration, at the point of union between the ulcerated and healthy parts, the mucous membrane was slightly undermined, and in its thickness, between the glandular conduits, existed a certain quantity of embryonic cells.

"The subcutaneous tissue at this level presented also a large number of these cells, and one refound them higher up, even at points where the mucous membrane was entirely healthy. At the level of the contracted portion, at the point most elevated and the least dilatable, which offers to the introduction of the finger and the passage of matter a great resistance, one found, not as is ordinarily taught, a tissue analogous to cicatricial, but a tissue analogous to '*bourgeons charnus*'—proud flesh. This tissue formed of new elements is very vascular, and offered little resistance to instruments when one sought to dilate it. It was only lower down in the widest part of the stricture that one saw fascicles of hard connective tissue surrounded by embryonic tissue, and presenting the characteristics of cicatricial tissue. Between the fascicles of the muscular tissue were found also a large number of embryonic infiltrated elements which reunited themselves at certain points. One saw again, between these, small abscesses which in the beginning are without doubt the origin of the little fistules which accompany, and which appear more often on the level or below the stricture than above it. Finally, in the part which was below the stricture and which corresponds to the sphincterian region, one observed almost always the cicatrices of an old ulceration." In late stricture produced by sclerosis of the muscular tissue we find only a homogeneous cicatricial mass. The peritonæum investing the upper portion of the rectum is frequently the seat of thickening and adhesions, showing traces of local peritonitis. This may become general, and is not an infrequent cause of death in stricture of the rectum.

Diagnosis.—The symptoms of syphilitic stricture of the rectum are extremely obscure before the period of ulceration or obstruction. The patient will have his attention called to it by an unnatural sensation in the parts when at stool. The desire to defecate is not so great nor the call so urgent as previously, neither is the relief so appreciable. The symptoms are of longer duration in syphilitic than in malignant or inflammatory stricture. It is no infrequent thing for a patient to experience them for years before they become marked enough for them to consult a physician concerning them. Before the period of ulceration there is little or no pain, and after this, except at defecation or when the rectum is loaded with hard fæces, it is only slight. Occasionally we find cases in which it is quite intense, but then the ulceration is very deep, or it has involved the anal margin. After ulceration has occurred, the discharge of pus, constant diarrhœa, and inability to void large masses of fecal material without great pain, will be of material assistance in diagnosticating the disease.

By digital examination we may learn much even in the early stages of the disease. If the stricture is narrow, annular, with sharp edges, and located below or on the level of the border of the levator-ani muscle, it is probably not syphilitic, but chancroidal or inflammatory. In a syphilitic stricture the contracture is long and tubular, and the walls give the sensation of a stiff, leathery deposit beneath the mucous membrane. It is homogeneous, and not nodular like carcinoma, although in exceptional cases, where the stricture is due to gummata, this may be the case. But here the intervening tissues are healthy, and the mucous membrane may be moved over the nodular mass, which can not be done in carcinoma. After ulceration in syphilitic stricture the condition of the parts is so variable that it is almost impossible to distinguish it from malignant disease except by microscopical examination. The diagnostic point that syphilitic stricture and ulceration do not break down before the finger like cancer, is not reliable. I have seen two cases in which the ulcerated part broke down so easily and bled so profusely that I was constrained to call them cancerous but for their history. Both cases under the microscope proved not to be cancerous, and they recovered under appropriate antisyphilitic treatment.

There are usually dilatation of the rectum and ulceration of the mucous membrane above the stricture. This ulceration gradually extends downward until it involves the whole rectum. The lower end of the rectum may be studded with papillomata or adenomata, and the perineal region is thickened by hyperplastic infiltration to a variable degree. Hypertrophied tags of skin hang about the anus, and through these may be seen occasionally multiple dry fistulas. Trélat has reported a case in which there were fifteen of these (Prog. Méd., 1878, p. 473). Other small fistulas are seen to open upon the level of or just below the stricture. One might suppose that these were the efforts of Nature to construct a new passage in place of the one pathologically closed, but they are due to points of undermining and small abscesses beneath the mucous membrane; they are within the stricture, subtegumentary not submuscular, and could not possibly relieve the obstructed bowel. Trélat believes these small, dry fistulas are pathognomonic evidences of syphilis. Through a speculum the mucous membrane before ulceration appears of dark, bluish-red color; after ulceration it is ragged, and covered with a grayish pseudomembrane or sanguino-purulent discharge. The portion for microscopical examination should be taken from the base of the ulcer, or through the whole thickness of the mucous membrane upon its edge.

In rectal syphiloma the whole or greater portion of the circumference of the rectum is involved; so also in muscular infiltration; but in the other forms only a limited portion is affected. In these two forms there is no intervention of healthy tissue between the diseased portions. The whole surface is homogeneous, while in the other varieties there may be several distinct spots of infiltration with healthy tissue intervening.

By attention to these points we may generally diagnose not only syphilitic from nonsyphilitic stricture, but the different varieties of specific stricture from each other, and thus be able to give fairly accurate prognoses of the cases.

Treatment.—The general treatment of syphilis of the rectum differs in no wise from that of the disease elsewhere, except that it is less successful, but the local treatment varies considerably, and is much more necessary here than in other parts of the body. The initial lesion generally heals without assistance; in fact, it comes and goes in many cases without the victim even being aware of its presence. When they are observed, scrupulous cleanliness should be enjoined; a mild antiseptic wash, such as a weak solution of bichloride of mercury, carbolic acid, boric acid, or creoline, should be applied, and this followed by a soothing powder, such as bismuth, aristol, iodol, iodoform, or equal parts of oxide of zinc and calomel. When it occurs between the radial folds as a fissure, it may be painful, and sometimes persist even to chronicity. Such cases demand some stimulation. In the application of this it is important always to bear in mind the exceeding frequency with which obstinate neuroses are produced by irritation or cauterization about the anus and rectum. We should therefore proceed tentatively in these cases, using mild remedies at first, and only resorting to the escharotics in very obstinate cases. We should also remember that the chancre itself may be imperceptibly transformed into a secondary lesion, either a mucous patch or syphilitic ulceration, and where it has existed for three weeks or longer we should adopt a course of mercurials along with the milder local measures. A small pledget of cotton soaked in balsam of Peru, extract krameria, or a five-per-cent solution of carbolic acid in olive oil, usually relieve the pain and effect a cure in due time. Nitrate of silver, ten grains per fluidounce, gently applied with a camel's-hair brush, is sometimes very effectual. Stronger applications are rarely if ever necessary, for where these fail, together with constitutional treatment, it is better to anæsthetize the patient, stretch the sphincter thoroughly, and trim off with scissors the overlapping mucous folds. If the sore is complicated with chancroid, and has a tendency to phagedena, we may at the same time apply nitric acid or the actual cautery. It is best, however, to avoid the use of these agents about the anal orifice as long as possible. In all sores about the rectum and anus the bowels should be kept freely soluble. If the chancre is inside the rectum, daily movements of the bowels should be obtained, and each movement followed by irrigation with a fifty-per-cent saturated solution of boric acid. If necessary, these chancres may be touched with slightly stronger solutions than those about the anus, for the reflex irritation of these parts decreases the farther we ascend the gut. Ointments of aristol or iodoform, applied through a hard-rubber ointment carrier, may be useful in these cases. As a rule, however, these ulcers come and go, and the secondary symptoms manifest themselves without the initial lesion ever being discovered.

When secondary symptoms manifest themselves, the treatment of course becomes constitutional. I believe I am in accord with the best syphilographers in never administering mercury till these symptoms have appeared. The only apparent exception to this rule is in those cases of "transformation *in situ*" mentioned above. In this stage of the disease mercurials compose the large part of the treatment. I shall not consume space here to give even an outline of the general treatment of syphilis, as it will be thoroughly treated of elsewhere in this volume. In my own practice, hypodermic injections of mercuric chloride, inunctions, or mercuric baths, form the first course of treatment. It is important in syphilis of the rectum to keep the bowels soluble, but it is equally as important to keep them as much at rest as possible between the periods of going to stool. The internal administration of mercury keeps up peristaltic action of the bowel, and consequent spasm and unrest of the parts about the rectum and anus. It is desirable to avoid this, and by the use of other methods it can be accomplished, at least in a large measure.

I begin with one-twenty-fourth grain of bichloride of mercury hypodermically, increasing the dose each day until distinct physiological symptoms are produced. In nearly five hundred injections I have never had an abscess form in any case, although some of my friends have not had such favorable experiences. The secret lies in freshly prepared and filtered solutions of four to six grains per fluidounce, in making the injections into the deeper tissues, and in thorough rubbing of the parts after injecting, in order to disseminate the fluid. The subscapular folds are the best points for making this injection, although the nates may be used if much soreness should result in the subscapular regions, before the constitutional effects have been produced. Occasionally a slight diarrhœa will be produced by this method, but it is rare, and easily checked by small doses of opium. I have not found it necessary to use morphine in combination with the sublimate on account of pain, as is advised by Lewin.

Of the inunction and bath, the protiodide, red iodide, chloride, and other preparations of mercury, it is unnecessary for me to speak. Their uses are familiar, and will be found under the head of The Treatment of Syphilis. It is necessary to remember that all these remedies are rather slow in producing effects upon syphilitic manifestations about the rectum and anus. After the physiological effects of the mercury have been produced, it is my practice to put the patient upon mixed treatment, supplemented by tonics, cod-liver oil, and regulated full diet.

The local treatment of these secondary manifestations consists in cleanliness, the protection of the healthy from the diseased parts, stimulating, soothing, or drying applications, such as in the initial lesions, according to the indications at the time.

In the extensive secondo-tertiary ulcerations these remedies will often fail notwithstanding there is no marked stricture of the part. It then becomes necessary to do something more radical. The indications are for perfect rest and protection to the parts; and if rest in bed and milk diet have failed, the only way this can be given is through a temporary colotomy. It is surprising to see how rapidly these ulcers heal, and to what a degree the health of such patients improves, when the irritation of fecal passages has been removed. The operation is fully described in works on surgery and diseases of the rectum. R. W. Taylor (Jour. Cut. and Vener. Dis., 1886, p. 228) advises the insufflation of equal parts of bismuth subnitrate and iodoform for these ulcers. It is useful, no doubt, but it requires the introduction of a speculum, which is painful, and which scrapes most of the powder off when it is withdrawn. I have recently used iodoform ointment, together with irrigation, very successfully in two cases.

Upon the tertiary syphilitic lesions of the rectum and anus mercury has little effect. Iodide of potash, continued in increasing doses, is here our sheet-anchor. Nevertheless, a sharp and decisive course of mercury should be carried out in every such case before we set it aside as useless. I have seen three cases of tertiary syphilis of the rectum, gumma, stricture with ulceration, and syphiloma, greatly benefited by the use of mercurials, and the chance of its acting so should not be lost to the patient. Ulcerated gummata should be scraped out with a Volkmann's spoon, and afterward treated by irrigation as has been mentioned above. The rectal irrigator is described under Gonorrhœa of the Rectum in the previous volume of this work. The strictured portion of the canal should be dilated persistently with Wales's soft-rubber bougies. These should never be forced tightly into the stricture. There is danger of perforating the peritonæum, and of setting up severe peri-rectal inflammation in using force with the rectal bougies. Where the stricture is narrow and inflexible, and unaccompanied with much ulceration, posterior proctotomy sometimes gives excellent results. The objection to this is, that it leaves an ulceration in syphilitic tissues which may take on the nature of the disease, produce great destruction of the parts, and eventually leave a denser, wider stricture than before. If the patient is thoroughly under the influence of antisyphilitic medication, this is not likely to take place. Where there is a long, narrow stricture of the rectum, with much ulceration and degeneration of the tissues, so that it breaks down before the finger like cancer, the bougie and posterior proctotomy are of little service. Since Kraske has demonstrated the feasibility of removing large portions of the rectum, there has been a tendency to practice excision upon these cases. I am not convinced of the wisdom of this method. We can not be certain that the portion of the gut brought down will not be ulcerated; the operation is exceedingly long and dangerous; the peri-rectal tissues are syphilitic as well as the rectal, which militates against immediate union—a great consideration in this operation—and after the excision is accomplished the patient has only partial control of the bowels. It seems to me that the results do not justify the risk assumed. Inguinal colotomy is infinitely safer, and the result almost as comfortable for the patient. At the same time proctotomy may be done, and in the majority of cases the ulceration of the rectum will heal, and if the bougie is judiciously used during this period the organ will be restored to a good caliber. If deemed advisable, the artificial anus may be eventually closed. I have lately done this operation in such a case with the promise of excellent results, there remaining now only the closure of the inguinal anus to be done. Divulsion and the cautery should not be thought of in these cases.

In ano-rectal syphiloma, and the quatenary lesions described by Trélat, if the treatment is begun early it is usually very effectual; but if the disease has advanced to atrophy of the muscles and ulceration, little hope can be offered to the patient except thorough excision or a permanent artificial anus. Iodides should be given freely in these cases, the rectum irrigated frequently with hot boric-acid solution to stimulate the circulation, and bougies passed every third day. These bougies should not be forced in. They should be of a size which will fit easily in the strictured part, and they should be left in from a quarter of an hour to two hours, according to the irritability of the patient.

CONGENITAL SYPHILIS OF THE RECTUM.

Anal and rectal lesions are among the earliest and most frequent manifestations of hereditary syphilis. They may appear at any time from birth to twelve months thereafter. I have seen one case of syphilitic erythema with numerous dry fissures in a child three days old.

The first of these lesions is an erythema, sometimes erosion, which may be easily mistaken for chafing and irritation by fæces and urine. The skin is red or copper-colored, elevated and thickened about the anus, and bathed with a fetid discharge. Between the radial folds are numerous little dry fissures which do not extend above the sphincter. Ulceration develops in the first three or four months if the disease is not treated, but it has never been my fortune to see a mucous patch in a child under two years of age. Other specific lesions soon manifest themselves to corroborate the diagnosis if it be in doubt.

From the first to the fourth year tertiary symptoms manifest themselves. A very interesting case was presented to my clinic lately in the person of a little girl, two years of age, who had suffered from shortly after birth with inflammation about the rectum. Examination showed tubercular syphilides upon the folds of the nates, a distinct, thickened and leathery condition of the rectal wall, and three well-marked gummata in the organ. There were crescentic patches of papular syphilides at several points upon her body. The father denied venereal taint, but at the time he had a tertiary eruption upon his body, and a small syphilitic ulcer in his rectum. They have both improved rapidly under treatment, and promise good results.

The *treatment* for congenital syphilis of the rectum and anus is the same as that for the disease elsewhere. Mercuric inunctions either through the stomach bandage of the infant, or through rubbing, followed by iodide of potassium and local applications, such as have been mentioned above, suffice to cure most of these cases, but in some the general system is so undermined by the disease that nothing is of avail. If the rectums of the children of suspected parents were systematically watched, I have no doubt many of these cases would be recognized early enough to avoid the disastrous results of the disease in early life.

SYPHILIS OF THE GENITO-URINARY SYSTEM, MALE AND FEMALE.

BY EUGENE FULLER, M. D.

I. SYPHILIS OF THE GENERATIVE ORGANS.

THE MALE ORGANS.—THE PENIS.

The Initial Lesion—Situation.—In the vast majority of instances an abraded area on the penis furnishes the germ of syphilis the necessary lodging place from which general systemic infection ensues. The exact site of the infection and of the consequent initial lesion depends on the location of the abrasion. If a man on exposure does not have or fails to produce an abrasion, he escapes syphilitic infection. The study of the subject of abrasions, therefore, is an important matter not only as regards prophylaxis—which does not here concern us—but also in determining the topographical distribution of penile chancres. The mucous membrane of the foreskin offers the most likely field, since in so many individuals this portion of the anatomy is from neglect, oftentimes dating from childhood, the seat of chronic inflammatory changes which rob the mucous membrane of its natural smoothness and elasticity, thus allowing it to become denuded on the occasion of slight friction or ruptured from moderate tension. The same causes account for the frequency of chancres in the sulcus behind the corona and along the line of junction of the mucous membrane of the foreskin with that of the glans penis. In such individuals the simple wiping off of the smegma with cotton, in order to expose the mucous membrane, will often bring blood. In these cases also it is common, on careful observation, to see little folds of mucous membrane bound together by false adhesions, the result of former attacks of balanitis. A little tension on this area will straighten out these folds, leaving a raw, bleeding line as a result. Another favorite site for abrasions is on the frænum, which in some individuals is very prominent, standing out as a sharp ridge when the penis is erect and the foreskin retracted. I remember one instance where an exaggerated prominence of this condition of the frænum was on the verge of causing a marital separation, the wife complaining that she suffered during intercourse as if she was being cut with a knife. On dividing the frænum all complaint ceased. The junction of the cuticle of the foreskin with the mucous membrane is also frequently the site of chancres. The epithelium on this part, when the organ is in the state of repose, is subjected to constant friction, which, together with the dribbling of urine after micturition, often occasions a chapping of the parts, thus allowing an easy access to the virus on exposure. The prominent border of the corona glandis is at times abraded. It is rather unusual, however, for the part to suffer as the result of a single coitus, as the epithelium, although soft and sensitive, is apt to be tough. Hence the observer in these cases usually gets a history of repeated and prolonged indulgence. Other portions of the glans are much less exposed than the corona, consequently lesions there are rare. Chancres of the sheath of the penis are not very common, as the skin will stand much friction in this locality without injury. When they do occur, their position is usually determined by a preceding attack of herpes progenitalis, or by an inflammation existing in connection with a hair follicle, or a sebaceous gland, causes which of themselves produce an existing abrasion or easily allow of a fresh one being made.

Secondary Syphilitic Manifestations on the Penis.—The secondary eruptions on the cutaneous portion of the penis are not usually as general as on the trunk or limbs. They customarily, when developed, present a macular appearance. With these modifications there is nothing to be said on secondary cutaneous lesions of the penis which does not apply to the general cutaneous surface, which topic is thoroughly treated elsewhere. The secondary lesions of the muco-membranous portion, however, are deserving of some special notice. In individuals who have been circumcised, or who habitually wear their foreskin retracted, thus keeping the parts dry and free from glandular deposits, syphilis in its second stage causes little inconvenience. It appears usually as papulo-squamous or macular lesions, the tendency to scaling being marked. There is moderate infiltration in the area involved. The tissue included by the original chancre seems to offer an attractive spot for these secondary manifestations, the tissues undergoing a re-engorgement, usually, however, of a moderate character. Such lesions are transient, and leave no pathological signs to mark their previous existence.

In individuals where the glans is covered by the prepuce the case is different, owing to the new element of moisture which is introduced. The lesions which under other circumstances are dry and squamous become moist, or, in other words, mucous patches. Then, again, moisture, which consists largely of urine dribblings and sebaceous glandular secretions, unless great cleanliness be observed, is, owing to its chemical decomposition, an agent productive of inflammatory changes in the mucous patches. These changes cause, in the first instance, an increase of the induration into the tissues underlying the plaque, thus tending to elevate it. Then, if the irritation still continues and no treatment is administered, a hypertrophy of the infiltrated subcutaneous stricture may ensue, giving rise to warty prominences called condylomata. These condylomata are not very common in the male. In connection with the female external genitals, however, they are much more frequent, as will be seen later on, when we consider that subject. This is because in the female another element of irritation besides moisture exists in a marked degree, which in the male is not prominent, namely, friction between the parts. More rarely, instead of infiltrations and hypertrophy resulting as a consequence of irritation in these conditions, ulcerative changes with loss of tissue occur. Such changes, however, which are the rule with later syphilis, are the exception during the secondary period; still, in some cases one sees such a blending of late secondary manifestations with precocious late ones that it may be hard to tell where the former ends and the latter begins.

Late Surface Manifestations on the Penis.—It is not very unusual for late syphilis to attack the sheath of the penis or its prepuce, and in these attacks the site of the initial lesion seems to be a very vulnerable spot; the glans, however, is rarely involved. Within the last year I have had two cases under my care. In one the syphilis was three and in the other four years old. In both cases there were multiple lesions in connection with the sheath of the penis and the prepuce, while in one of these cases there were numerous other gummatous cutaneous lesions coexisting. These lesions appear suddenly and spread rapidly, hard rupia-like crusts forming over them in case they are kept dry. When these crusts are removed a sloughing surface is exposed, the undermined edges of the lesion showing it, when fully exposed, to be much more extensive than the investigator had expected. These manifestations, however, extend by involving the surface, in contradistinction to the deep structures. Under appropriate treatment they slowly and stubbornly yield, healthy granulations at last springing up. It is wonderful, after thorough resolution has taken place, to note how little eventually remains to mark the site of often very extensive lesions. Jullien (Mal. Vénériennes), however, reports that the cicatrix resulting from these gummatous cutaneous lesions sometimes is so adherent to the deeper structures that it causes a traction on and some deflection of the organ when in a state of erection. The great mistake is to treat these cases by thorough cauterization, on the supposition that they are chancroids, which they strongly resemble under phagedenic conditions.

Differential Diagnosis.—The initial lesion is ordinarily to be distinguished from herpes progenitalis, chancroid, benign lesions, balanitis, tuberculous lesions, malignant growths, and later stages of syphilis.

Herpes.—The practitioner is very frequently consulted by nervous individuals who, by watching themselves overcarefully after a suspicious intercourse, become alarmed over the appearance of a crop of herpetic vesicles. A patch of herpes and an initial lesion are so unlike that no trouble should be experienced in making a correct differential diagnosis. Between an inflamed spot, however, caused by a preceding outbreak of vesicles and a commencing initial lesion, it is often, in the absence of an intelligent history, difficult to make a positive immediate diagnosis. A little observation will definitely settle the question, as the superficial abrasion left by herpes, if not further inflamed, very quickly gets entirely well, leaving no induration.

Chancroid.—The differential points in the diagnosis between the initial lesion of syphilis and the chancroid, or simple chancre, have been so elaborately set forth in the article on Primary Syphilis as to render unnecessary further reference to the subject.

Benign Lesions.—By these are meant simple traumatisms or excoriations, occasioned by vigorous coitus, usually when the vagina is narrow. Such lesions occasionally become indurated and heal very slowly, oftentimes taking upon themselves many of the characteristics of the initial lesion. In such cases a positive diagnosis excluding syphilis can only be made by keeping the patient under observation for a time, in order to see whether any secondary manifestations develop. Within the last six months I have had under observation two such cases, which eventually were demonstrated to be benign. In both of these not only I myself, but Dr. Keyes also, was inclined at one period strongly to the diagnosis of hard chancre. These cases illustrate the soundness of the general rule, which is, to make a positive diagnosis of syphilis only when secondary symptoms follow the primary lesion.

Balanitis.—This condition sometimes in uncleanly individuals, in whom the prepuce can not be retracted, causes the appearance of nodules or plates of induration, which can be felt by pinching the cutaneous tissues of the foreskin, generally in the neighborhood of the corona. These nodules, if nonsyphilitic, together with the existing balanitis, generally disappear speedily after a few treatments with an antiseptic subpreputial douche, thus determining the diagnosis.

Tuberculous lesions are rare on the penis. They are mentioned here simply for completeness. Careful investigation into the history of the case, together with the demonstration of the existence of the tubercle bacillus, would positively decide the nature of the lesion.

Malignant Growths.—Primary epithelioma of the glands, less frequently of the prepuce, is not very rare in advanced age. In its early stages it sometimes resembles the initial lesion quite closely. This resemblance, however, does not last long, as the growth soon involves the whole glans and quickly extends along the corpus spongiosum, making the urethra feel like a pipestem. The primary lesion never extends in this manner. These points, together with the history of the case, and the fact that the lesion is not favorably influenced by syphilitic treatment, soon prove its true character.

Secondary manifestations may sometimes be mistaken for the primary sore. If, however, a careful examination be made, such a mistake would seem hardly excusable. A case came to me, some time since, which illustrates this error in a marked degree. An Englishman who had almost completed a tour around the world presented himself, stating that I would probably be interested in his case, owing to its rarity, as he had caught syphilis, according to the medical opinions he had received, three times in six months during his travels. He further stated that his last chancre had not as yet entirely healed. On examination, I found the remains of an indurated mucous patch under the foreskin, together with numerous generally distributed secondary lesions which had probably existed from two to three months. This patient on his journey had endeavored to consult the best medical advice obtainable. Tertiary cutaneous lesions might possibly at their very commencement, in the absence of any previous history, be confounded with the initial lesion. This mistake would, however, very soon become apparent, owing to the progressive phagedenic changes which speedily ensue.

Secondary penile syphilis may also be more or less closely imitated in appearance by eczema, psoriasis, lichen planus, erythema multiforme, scabies, balanitis, vegetable parasitic conditions, herpes, and traumatisms. When hypertrophic changes take place, a differential diagnosis between syphilitic condylomata and venereal warts is often called for. A lengthy consideration of the special points in the differential diagnosis of most of these affections could not be entered into here without a special study of their general characteristics, which study belongs to dermatology, and will be considered in the volume of this series devoted to that department. A few general remarks, however, will not be out of place. In studying syphilis, and especially secondary syphilis, the thorough observer never confines his attention to one organ, but inspects the whole visible anatomy. By so doing the diagnosis, in many cases, can be positively and speedily made, where otherwise a question of doubt would remain until the effects of various treatments had been tried. Take, for example, a lesion on the penis where there is a question of diagnosis between secondary syphilis and eczema. If the disease is syphilis, one will surely find confirmatory evidences somewhere on careful general inspection. If it is not syphilis, not only will these evidences be lacking, but also in all probability further signs, some of them typical in character of eczema, will be discovered. In this way a positive diagnosis is made. In some of these affections, as balanitis, herpes, and traumatism, the negative evidence afforded by finding no traces of secondary syphilis on general inspection, together with an absence of a satisfactory history, would be sufficient to incline one's opinion very strongly against syphilis, and to induce a form of treatment anti-syphilitic in character. Of course, it is only very rarely that this last group of conditions can so simulate secondary manifestations as to make a differential diagnosis a matter of any question.

In diagnosing simple from syphilitic condylomata, besides the considerations just stated, it may be well to mention a few special points. In the first place, the pathology of the two conditions should be compared. They are both hypertrophies of the papillary layer of the skin as the result of persistent inflammatory conditions. With syphilis the hypertrophy exists, as has been mentioned, in connection with a mucous patch of long standing which has been subjected to considerable continuous irritation. As a result, there is much infiltration of the structures forming the base of the hypertrophy. The growths under such conditions do not spring from a slender pedicle, but from a broad surface usually corresponding to the area of the patch. Simple condylomata also result as a consequence of a continued irritation of a light grade, caused by the presence under the foreskin of the decomposed products of the natural secretions and excretions. Here, however, there is no denuded area and no marked infiltration necessary as a starting point; but the hypertrophies, when recent, are seen sprouting up here and there in little delicate tufts. These tufts grow generally quite rapidly if the parts are still kept moist, branching out like a cauliflower from the slender pedicle. After a time these cauliflowerlike excrescences increase so extensively that they impinge against neighboring analogous growths, thus forming a rather extensive surface. The superficial appearances of these two conditions under these circumstances may bear a marked resemblance. If, now, one takes a curette and applies it rather vigorously, the growths, provided they are simple in character, are readily removed, leaving little punctate, bleeding surfaces. After the bleeding is checked the feel of the part occupied by the growth is quite natural, but little infiltration existing, and that of a general character. In the case of syphilitic condylomata, however, curetting accomplishes different and much less satisfactory results. The growths are found to be tough. On scraping them the tops are removed, disclosing the broad infiltrated pedicles, which resist all but the most vigorous scraping. The bleeding, however, owing to the infiltrated condition of the parts, is usually less than in the first instance. The feel also shows the area involved to be hardened and nodular. There is another instance, very unusual, however, in which a condylomatous condition of the penis may exist, and that is in connection with epithelioma of the part. I have seen but one such case. Here the growths, after reaching a certain stage in their development, were attacked by ulcerative destructive processes in a manner which made the question of diagnosis an easy matter.

As regards *late cutaneous syphilis of the penis*, there is little besides chancroid, and possibly malignant growth, with which it could be confounded. Between it and chancroid, however, there is often a very close resemblance, so that it is well to put the practitioner on his guard. With chancroid the history of a very recent suspicious intercourse can be obtained, together with much pain in connection with the sore. With the syphilitic lesion there is generally an absence of any marked pain, and usually no history of a preceding suspicious connection. There is also the history of former syphilis in most cases, and often, as has been stated, corresponding lesions in other parts. Then, again, phagedenic changes, coming on very suddenly, are associated with this form of syphilis in individuals who often seem to be in the enjoyment of robust health—a state of affairs that one would hardly expect to find with chancroids under like conditions. Then, again, if the lesion is syphilitic, treatment applicable to chancroids only makes matters worse, the iodides and mercurials alone proving efficacious, even these acting sometimes very slowly.

Syphilis of the Corpora Cavernosa.—This structure is attacked only by late syphilis, and very rarely at that. The lesions are customarily situated nearer the extremity than the base of the organ. They appear as nodules, varying from the size of a pea to that of a hazelnut. Their advent is very insidious, as they are accompanied by no pain or tenderness. What calls the patient's attention to them is the fact that they interfere with uniformity in erection, producing a state of chordee during such a condition. The organ when erect is consequently deviated, generally laterally, but sometimes in an upward or downward direction, according to the situation of the lesions. Ricord relates a case of this condition where several of these lesions existed in one of the corpora cavernosa, the result being that on erection the penis presented the appearance of a ring. These nodules do not appear to readily break down, as do the late cutaneous lesions, thus forming communications with the surface or with the urethra. I have never seen such a complication in this condition. These syphilitic lesions are to be carefully distinguished from the condition known as chronic circumscribed inflammation of the corpora cavernosa, fully described by Van Buren and Keyes and others. This last disease apparently occurs more frequently associated with gouty or diabetic individuals than otherwise, although I have seen it in a number of instances where I failed to discover any trace of these two assumedly predisposing affections. It is sometimes impossible to make a differential diagnosis between these two conditions without recourse to treatment directed toward syphilis, under which circumstances the lesions, if gummatous, disappear, otherwise remain unaffected. Still, there is a point of difference in the appearance of these two lesions. The chronic circumscribed inflammation occurs usually as rather irregularly shaped plates of hardness, while with syphilis the manifestations are liable to be rounded. Both these conditions are painless, except for the disturbances they cause during erection.

SYPHILIS OF THE URETHRA.

The Primary Lesion.—The inoculation of syphilis at the meatus is not very uncommon. The chancre may very rarely have its site in the fossa navicularis. Any deeper point of inoculation, certainly as a result of sexual intercourse, does not seem to exist. Chancres at the meatus and in the fossa navicularis have a few characteristics peculiar to themselves, owing to their position—that is, the infiltration in this part subsequent to the inoculation serves in a greater or less degree to temporarily obstruct the flow of urine. Sometimes, in the case of individuals where the natural meatus is narrow, this obstruction may become so great as to be serious. In such cases surgical interference, or, what is much better, early mercurial treatment, may be called for. Cutting or divulsing is not advised unless immediate relief is required, since by these measures the chancre is inflamed and the infiltration increased. Secondary syphilis of the urethra is met with every now and then, the symptoms set up being those usually of urethritis, more rarely of stricture. It seldom gives rise to much trouble, unless subjected to injudicious forms of treatment, which act as irritants.

In 1873 Henry Lee, of London, delivered two Lettsomian lectures on syphilitic urethral discharges. Since then a number of articles have appeared on the subject. This form of urethritis gives rise to little pain or discomfort other than that which a urethral discharge by its mere presence always occasions. The discharge itself is inclined to be watery in character. It is usually found in connection with individuals whose urethræ have previously been attacked by gonorrhœa, so that in some cases it may be an open question whether the urethra is the site of a special secondary attack, or whether the cachexia and the febrile disturbances consequent on the advent of secondary syphilis have not in themselves been sufficient to stir up granular urethral lesions resulting from former gonorrhœa. However, the fact that true mucous patches in some of these cases do occur can be demonstrated by the endoscope. If the mucous patches along the urethra are inflamed they become infiltrated and nodular, causing more or less stricture. It may be well to relate here the history of one of these cases, taken from my record-book. A young man presented himself complaining of stricture and moderate gleet. Six months previously he had had a chancre, followed in due time by an eruption. For this he had taken a small amount of mercurial. The eruption disappeared, but in the course of a month he began to notice a discharge from the urethra. For this an astringent injection had been prescribed. The discharge, however, grew worse. Then, apparently, in the struggle to cure the discharge, the fact that syphilis existed seemed largely to have been forgotten. After several injections had been used without favorable results, sounds were brought into play. It was soon found that the urethra, instead of taking the same or increasing sizes in sounds, speedily contracted in caliber. The question of urethrotomy was then presented to the patient. After that different medical advice was sought. When I saw the patient, much pigmentation and some induration existed at the site of the initial lesion, which was in the sulcus just behind the corona. There were also specific signs in the throat and elsewhere. An endoscopic examination of the urethra showed, about half an inch from the meatus, an extensive mucous patch covered with a light grayish film which could with difficulty be scraped off, leaving an oozing surface. The base of this patch was much infiltrated, causing a dense stricture. Local treatment was stopped, and large doses of mercurials administered, with the result that all the urethral discharge soon ceased. Some time afterward a careful examination of the urethra failed to detect any stricture, though a certain amount of lividity of the mucous membrane, marking the site of the plaque, still remained.

It is common for the urethra in individuals in the secondary stage of syphilis, when the use of sounds is attempted to dilate previously existing strictures, to take on as a result of such instrumentation, although no local evidences of syphilis previously existed, a low-grade inflammation, accompanied by such an amount of brawny infiltration that the walls of the urethra from the outside present something of the pipestem feeling.

Late urethral syphilis is very rare. It does, however, occur, Fournier, in particular, having recorded some well-authenticated cases. On two occasions I have had to deal with what at first sight seemed to be illustrations of this affection, but in both more extended study proved the first impression to be mistaken, one of them turning out to be chancroidal and the other cancerous. The usual history of gumma in this locality is that the lesion, which is generally situated not far distant from the meatus, first manifests itself by a rather free urethral discharge. The lesion causing the discharge is liable to extend, often involving the meatus and much of the glans. Sometimes it invades the whole thickness of the corpus spongiosum. In such instances it is common for the destruction of the tissue to be so extensive as to cause fistulous openings. These lesions frequently become markedly phagedenic, the same as the corresponding cutaneous manifestations, and under such circumstances yield very slowly to treatment.

Differential Diagnosis.—If one bears in mind the general characteristics of urethral chancre, it can not well be mistaken for any other condition unless it be commencing epithelioma, and possibly the effects of traumatisms, tuberculous infiltration, or mucous patches. Epithelioma starting at the meatus may so nearly imitate a chancre that mercurial treatment will be called for in order to establish the differential diagnosis. Nothing need be said regarding traumatisms other than that, when accompanied by succeeding inflammatory changes, they may resemble the initial lesion. Tuberculous infiltration extending from its customary focus in the prostatic urethra forward as far as the anterior urethra, thus invading the region in which chancres exist, is very rare, and when it is present the chronic history of the disease, together with the associated incontinence of urine, would be sufficient to rule out all idea of chancre. An inflamed mucous patch, such as was seen in the case just previously related, might have been mistaken for a chancre if the general inspection of the patient had been wholly neglected.

Secondary urethral syphilis may be mistaken for simple or gonorrhœal urethritis or stricture resulting from these conditions, and that such is often the case has already been pointed out. The general inspection of the patient, together with the local examination, ought to suffice in determining the exact condition, especially when all ordinary methods of treatment fail to produce satisfactory results, unless, perchance, corrosive-sublimate irrigation be used for antisepsis.

Late urethral syphilis often requires much skillful attention before it can be positively diagnosed. It may be closely simulated by chancroid and cancer. The question of tubercle also should be borne in mind.

Chancroid of the meatus is very obstinate as regards treatment, and frequently extends some distance up the urethra. It is also quite destructive and very painful. It usually infects neighboring spots, forming new, nonadjacent sores. With the corresponding syphilitic sore, however, there is little or no pain. Its advent is insidious, and bears no relation to any recent coitus. It usually begins within the urethra and appears at the meatus by reason of extension. It involves the surrounding structures more deeply than does chancroid.

Epithelioma is a slow process compared with late syphilis in this part. It is more painful than syphilis, though less so than chancroid. There is much more surrounding infiltration. In epithelioma, when a red granular base to the ulcer exists, no evidences of repair follow. When such appearances are found with the syphilitic lesion repair is quite rapid. Both of these processes may form urethral fistulæ, though this tendency is greater with cancer than with syphilis. With cancer, condylomatous excrescences often coexist along with ulcerative processes. I have in alcohol a penis representing this condition. Here the condylomatous element became so abundant that but little urine could eventually pass the meatus, most of it flowing out of numerous fistulous tracts occasioned by cancerous ulcerations. This hypertrophic condition in connection with gumma apparently never exists. There might be a question between tubercle and cancer in this part, though hardly one between tubercle and syphilis. If, however, a question should arise between these conditions, which could not be settled otherwise, recourse should be had to the microscopical examination of a section of the tissue in dispute. One every now and then sees the statement that the entire penis may be destroyed by the ravages of late syphilis, a case of this nature reported by Jessop, of London (Brit. Med. Jour., Dec. 19, 1868), being usually referred to as authority for this assertion. Such an event may possibly occur; still, the case reported by Jessop seems to me on investigation to be unworthy of much consideration, as the history he gives does not correspond to one of syphilis. Then, again, some of his statements are so peculiar that the reader is forced to conclude that the reporter had a rather inexact knowledge regarding syphilis itself.

SYPHILIS OF THE PROSTATE.

This gland seems to be peculiarly exempt from syphilis in any of its stages of development. A few years ago Guyon and his pupil, Leanois, (Annal. des Mal. des Organ. Genito-Urin., Feb., 1889), published an article entitled Prostatismus Vesicale, in which prostatic hypertrophy occurring in elderly individuals was considered to be but a part of the general process of arterio-sclerosis, which condition, according to some authorities, occurs more frequently in individuals who formerly have had syphilis than otherwise. Within the last year, however, Casper, of Berlin (Berliner klin. Woch., 1892, No. 5), as a result of very extended investigations, showed that these two conditions have no connection, and that they are rarely found associated. Therefore, not even in this indirect way does syphilis seem to affect this part. Of course, the gland might become involved by the extension of a neighboring gumma, but I do not know that such a case has been recorded.

SYPHILIS OF THE SEMINAL VESICLES.

No observer, as far as I can find, has recorded an instance where syphilis has been encountered in connection with these organs. It is only, however, within the last few years that genito-urinary surgeons have thought it of importance to investigate carefully the condition of the vesicles. It is now known that pathological changes with reference to these sacs are not rare, and that they are the apparent cause of many obscure symptoms. It will not, therefore, be a matter of surprise if in the near future syphilis is shown to invade these organs.

SYPHILIS OF THE EPIDIDYMIS AND CORD.

The epididymis is rather frequently the seat of secondary syphilitic disturbances. More rarely it is involved in late syphilis, in which case the disease may manifest itself first of all in this part, or the epididymis may be consecutively involved as a result of the extension of the disease from the body proper of the testicle. Dron, of Lyons (Arch. de Méd., 6 ser., tome ii., p. 513), in 1863 first called attention to the presence and frequency of secondary syphilis in the epididymis. In 1872, Tanturri (Il Morgagni, 1872, fasc. 2) and Fournier (Mouvement Méd., Sept., Oct., et Nov., 1874) fully confirmed the statements originally put forward by Dron, and which until then had not been wholly indorsed by the profession. Since this last date numerous observers have called attention to the existence of this condition.

The lesion consists of a rather firm induration in connection generally with the head in contradistinction to the tail of the epididymis (the latter being the chief seat of gonorrhœal involvement). In size the induration commonly corresponds to a bean, rarely reaches the dimensions of a hazelnut, and sometimes only that of a pea. It usually occurs in the third or fourth month of the disease, being contemporary with the general eruption. It is a temporary condition, gradually fading away and leaving no trace, in a similar manner as the corresponding eruption. It oftentimes is bilateral.

To the feel the mass is movable, and not at all attached to the neighboring structures. No pain is liable to be caused by manipulation. In fact, the patient is almost always ignorant of the existence of anything unusual in this part unless his attention is directed to it by the surgeon. Rarely, however, according to Fournier and Balmé (Thèse de Paris, 1876), and since corroborated by a few other observers, this condition is ushered in by so much acute pain and tenderness that the patient has to take to his bed for a short interval. Such symptoms usually soon pass away, leaving the part nonsensitive and painless. There are a few exceptions to the rule that none of the neighboring structures are secondarily involved, as occasionally the testicle proper is slightly tumefied, and sometimes also the cord.

Jullien (Mal. Vénériennes, Paris, 1886) records a case where the adjacent tunica vaginalis participated to such an extent in this induration that a hydrocele resulted. The author resorted to aspiration, expecting to find a tubercular epididymitis. Resolution finally took place in this case promptly as the result of specific medication. The author does not mention the probable interval which had elapsed since inoculation. It was doubtless considerable. I am inclined to consider a condition somewhat corresponding to Jullien's case to be typical of late syphilis originating in the epididymis. Such also is the opinion of my associate, Dr. Keyes, who first called my attention to the condition about to be described. Keyes has seen six cases. I have seen two, one of them being independent of the six observed by Keyes. The usual history obtainable in one of these cases is much as follows: A man who has considered himself previously in a good state of health has his attention drawn to a swelling apparently in connection with one of his testicles, which is not at all painful, and which for a time generally gives him little concern. It gradually enlarges, however, and may attain the size of an orange or a cocoanut. It then causes trouble and inconvenience from its weight. A surgeon is consulted, who finds that a hydrocele exists. On careful manipulation a rather extensively indurated area is detected behind in the region of the epididymis. The dimensions, however, of this induration are much greater than those of the epididymis, and sometimes the subcutaneous structures of the scrotum may be quite adherent to it. In order to facilitate the examination the fluid contents of the hydrocele are removed by aspiration. This fluid was clear in all cases that I have observed. One can then easily feel the posterior induration, involving the epididymis and extending out from its entire border into the parietal portion of the adjoining tunica vaginalis, resembling somewhat an open oyster shell. The testicle proper is partially involved in case the induration is extensive. In some cases also the cord is thickened to a considerable degree. I have never seen this condition when it was bilateral. In these cases, if appropriate treatment were not resorted to, doubtless the epididymis would be eventually destroyed by gummatous formations.

A. d'Oelsnitz (Thèse de Paris, 1886) and Ozenne (Gaz. Hebdom. de Méd., 1888, 2 ser. xxv, p. 196), both pupils of Reclus, have published articles on syphilitic pachyvaginalitis, in which attention is called to a syphilitic process apparently largely, if not wholly, corresponding to the one I have just described as late syphilis involving the epididymis. Ozenne considers that hæmorrhage into the sac of the tunica vaginalis is so common in this condition that he entitles his article Hæmorrhagic Pachyvaginalitis of Syphilitic Origin. In this article, which is based largely on that of D'Oelsnitz, he recites six cases to illustrate his ideas; of these, two were taken from the practice of Reclus, three from that of Tedanat, and one from Nélaton. In case I, on drawing off bloody serum, the epididymis, testicle, and tunica vaginalis were all found thickened and infiltrated. In case II there was a double hydrocele. From the right side clear fluid was drawn, showing the epididymis and testicle to be much involved and the tunica to be thickened. From the left side bloody fluid was drawn, showing much the same condition to exist as on the right side, except that the testicle seemed to be more involved. In case III bloody fluid was withdrawn from one side, leaving, however, little that was apparently wrong to the feel in the neighboring structures. In cases IV and V the epididymes were found involved after bloody fluid had been withdrawn. In case VI the induration radiating from behind was so extensive that fluctuation could only be felt over a small area in front. If the development of these cases had been observed, it would probably have been seen that the epididymis was the structure from which the process originated, and that it was only at quite a late stage that the disease spread sufficiently to involve the parietal layer of the tunica vaginalis.

Apparently hæmorrhage from this inflamed structure is most common, though, strangely enough, I did not encounter it in the cases I have observed. In one of my cases the cord was also involved to a considerable degree, though such a complication was not mentioned in Ozenne's cases. In these cases generally the history of a previous syphilis can be obtained, but, in all, the test that the condition is syphilitic rather than tuberculous (the only other condition that could well be confounded with it) is, that under vigorous and persistent treatment directed to late syphilis the indurations slowly melt and the hydroceles disappear.

True gumma, involving and originating in the epididymis, is rare. Berthole (Union Méd., 1868, p. 57) records a case apparently illustrating this condition, where gummatous material discharged itself from two sinuses connecting with the epididymis.

Of course, in most cases, where late syphilis is determined toward the scrotal contents, the body proper of the testicles is the part involved, the epididymis becoming affected, if at all, by an extension of the disease from the testicles. In these cases of involvement by extension the epididymis usually becomes simply indurated, is but moderately increased in size, and does not throw out, as it were, spurs of induration into the neighboring parietal layers of the tunica vaginalis, as takes place when the corresponding process is primary in the organ.

Late syphilis seems very rarely to attack the *cord* independently of the neighboring or connecting structures. On one occasion, in the case of a gentleman who had contracted syphilis some years previously, I observed the appearance of a painless quite firm tumor, which attained the size of an almond, in connection with the cord of the left side, just outside of the external ring. Under a mixed treatment this soon disappeared. Bert (Annales de la Polyclin. de Bordeaux, 1889, vol. i, p. 41) has also observed such syphilitic manifestations, the remaining scrotal structures being apparently free from disease.

Late syphilis of the *testicle proper* is common. Many writers have recorded the results of their observations in this connection, among them Curling, in his classical work on the testicle, so I will not enter into an exhaustive study here of a condition so well known. Virchow considers that late syphilis of the testicle manifests itself by two distinct pathological processes: (1) sclerosis of the connective tissue; (2) gummatous formations. In the first of these processes the organ early in the attack is moderately enlarged. It is not tender, and causes little inconvenience—sometimes so little, in fact, as not to attract the attention of a phlegmatic individual at all. Oftentimes there is an accompanying hydrocele, which of itself is very noticeable. Still, the element of hydrocele in this condition and in that where gumma exists is not liable to be nearly so prominent as it was in connection with late syphilis of the epididymis, the rather infrequent condition just previously described. This is apparently due to the fact that the visceral layer of the tunica vaginalis usually is so involved in the syphilitic process at an early stage as to form firm adhesions with the parietal layer, thus oftentimes largely obliterating the sac, so that little space finally remains in which to accommodate the effusion which later on has a strong tendency to collect. As time progresses in an attack of this nature, the testicle, which at first was, as has been noted, moderately enlarged, gradually begins to contract as the sclerotic element in reference to the connective tissues asserts itself. This increasing pressure finally serves to destroy the parenchyma of the organ, and atrophy results.

In the second process there is gummatous formation. Here at an early stage the enlargement of the testicle is greater than in the other instance, the size of a goose's egg being frequently attained. The organ is hard and dense to the feel. It is not tender, and, in fact, the ordinary testicular feel is wanting. Commonly the contour of the testicle is regular, though at times it may be nodular, in which instances there usually exist multiple gummatous foci. If now the process is allowed to progress undisturbed, it will be found that over a certain area the scrotal tissues become gradually more and more adherent to the testicle. Then over this area the surface of the scrotum at length presents a red, glazed appearance. Should palpation be resorted to, it will be found that in the center of this red, glazed surface a sensation of commencing softening, and perhaps indistinct fluctuation, can be detected. Shortly after this the area under observation will commence to bulge out. Distinct fluctuation can now be detected, although no pain, tenderness, or heat is found associated.

As a next step the tissues in the middle of this spot break down, giving exit to abundant glazy, gummatous material. After the destructive force of the gumma has spent itself Nature attempts repair. Granulations spring up, but at the same time a contraction sets in in connection with the firm capsule of the testicle, and as the contents of the organ can offer no resistance, owing to the opening left by the gumma, more or less of the parenchyma is crowded out at the opening, covered by the granulations which line the cavity. This condition constitutes the benign fungus concerning which so much has been written. One does not see this state of affairs very often now, at least in parts of the world adjacent to medical centers, since the process of destruction leading up to this result is so well recognized that the sufferer is put on syphilitic treatment promptly, thus arresting developments. Of course, if this progress goes on to the discharging of the gumma, the testicle is destroyed. Such also is the result even if the gumma does not develop sufficiently to discharge, as atrophic changes set in much as occur in the other sclerotic process which has just been described. One is not, however, apt to see many cases of late syphilis of the testicle where one of these pathological processes exists to the utter seclusion of the other, since commonly, in a given case, there is a blending to a greater or less degree of both. These late lesions of the testicles are quite frequently bilateral.

Differential Diagnosis.—*Secondary syphilis of the epididymis* might be confounded with the induration resulting from a former acute gonorrhœal epididymitis, with tuberculous disease, with a deep-seated cystic formation, and possibly with a commencing malignant disease. A former gonorrhœal epididymitis leaves a small induration in connection with the tail of the epididymis, while secondary syphilis involves the head. Then the remaining gonorrhœal induration is permanent, dating from the acute attack, which is always so painful that it is never forgotten ; while on the other hand the syphilitic affection under consideration is only a temporary affair, corresponding to the surface manifestations of that stage.

Commencing tuberculous disease of the epididymis can simulate secondary syphilis of the part. Tuberculous induration is somewhat tender; syphilitic is not. Tubercle generally involves at the same time the prostatic urethra and the cord to the some extent, though it can be primary in the epididymis. This stage of syphilis apparently does not involve these parts, or, if it does, it gives rise to no symptoms. General inspection and the results of treatment will be sufficient to make the diagnosis positive in the event of doubt.

A little cyst of the epididymis might be mistaken for syphilitic induration. Here, however, the absence of general secondary symptoms and the permanence of the cystic lesion under treatment would rule out syphilis. The same reasoning would also apply to commencing malignant disease.

Late syphilis of the epididymis is closely simulated by tubercle; less so by malignant disease and the effects of a traumatism. Many cases of late syphilis of this part are probably confounded with tubercle. The points of difference are, that often the syphilitic affection occurs in men who have no tuberculous antecedents or apparent tendencies. They feel perfectly well with this trouble except for its mechanical inconvenience. The vesical neck is never involved. Often a previous history of syphilis is obtainable, and last of all the lesion yields to antisyphilitic treatment.

With tubercle the observer generally finds the antecedents of that disease. The lesion is usually more or less painful and tender on manipulation. The newly infiltrated tissue also is liable to break down, forming at first numerous little abscesses, which eventually coalesce into larger ones. When tubercle has progressed so far as to imitate this lesion of syphilis, the cord and vesical wall, as well as the neck of the bladder and prostate, are liable to be involved to a marked degree. Malignant disease of this part when so extensive would probably be painful. It would involve the connecting lymphatics. It would extend itself more symmetrically, attacking all adjacent structures. When one aspirates the hydrocele associated with late syphilis and finds the fluid withdrawn to be bloody, the thought of a hæmatocele might at first be entertained. An hæmatocele, however, is a tumor, which appears very suddenly, as the direct result of some injury. In this condition, also, when the fluid is withdrawn palpation shows no dense effusion surrounding the epididymis.

The only way to decide between late syphilis in connection with the cord and cystic or malignant disease, is to put the patient on treatment directed toward syphilis.

Late syphilis, however, confined to the cord, is so rare that little need be said with reference to its differential diagnosis. Late syphilis of the testicle proper should be distinguished from malignant disease, cystic degeneration, tubercle, and traumatic conditions. Malignant disease is more common in this locality during young life than afterward. It may also, by reason of destructive processes, form a fungus in much the same way as does the syphilitic condition. The disease, which may be quite painful, is liable to be very progressive, especially if the subject is young, involving rapidly the connecting lymphatics, the cord, and adjoining structures generally. It is held in check by no form of medication. Cases have been noted where a malignant process has grafted itself on to a testicle which had previously been damaged by syphilis. Cystic degeneration can rarely give a careful observer much trouble in making a differential diagnosis. Still, if there should be any doubt, a fine aspirating needle would settle it.

Tubercle with reference to the testicle seems always to have reached that part by a process of extension from the epididymis. Even in the most severe instances where the scrotum is riddled by sinuses, and where there is almost complete disorganization of the epididymis and the cord, the testicle proper will still be found quite natural to the feel and but little involved. Acting on this pathological immunity of the testicle, Keyes (see Sarjous's Annual, 1892, article on Genito-Urinary Surgery) in such conditions removes the epididymis, together with a section of the cord, and leaves the body proper of the testicle with so far uniformly good results. In the case of syphilis the testicle never remains soft and natural to the feel. There is no tendency to suppuration. The testicle proper is primarily involved, except in the rare condition I have considered under the head of the epididymis.

The results of a severe traumatism might, in the absence of all history (a state of affairs which would hardly be presumable), somewhat resemble late syphilis. Still, even then some remaining ecchymosis and bruising could be seen in connection with the scrotum.

Occasionally, in the case of young children who have inherited syphilis, the testicle proper may be attacked in the same manner as has just been described in connection with the late acquired form of the disease.

The effects of syphilis on the testicle and its connections, as regards the reproductive power of the individual, is deserving of a brief consideration. Secondary syphilis, as has been proved by examinations of the semen ejaculated from individuals affected at the time with characteristic lesions of both sides, does not interfere with the passage through the parts and up into the vesicles of spermatozoa. Such, as is well known, is not the case with reference to gonorrhœal involvement of these organs. Late syphilis, of course, owing to the sclerotic changes which ensue, eventually destroys the function of the organ attacked, so that as a result of bilateral involvement the individual becomes sterile.

Bryson, of St. Louis (St. Louis Courier of Medicine, 1882, vii., p. 485), records five cases where men who had had syphilis previous to marriage eventually became sterile after having impregnated their wives in all instances once and in most cases several times during the period shortly succeeding marriage. Finally, no more impregnations taking place, though potency remained, these individuals sought medical advice, and in each instance Bryson found sterility to exist. Nothing wrong could be detected in connection with the testicles, however, except that they were a little more sensitive to the touch and a little less firm in consistency than normal. No treatment benefited these cases. The assumption is made in the article that this state of affairs was due to the preceding syphilis. Whether the lesions causing the sterility were associated with the nervous center or the testicle was not known. In fact, there is no proof offered that syphilis had anything to do with sterility in these cases. Still, one has a right to assume that it may have, owing to its uniform association with the previous history. Perhaps further observation will throw more light on this point.

SYPHILIS OF THE SCROTUM.

There is little that need be said here on syphilis in connection with the scrotum, as this subject has been considered under surface syphilitic manifestations. I will, however, make a few general statements. In most instances secondary lesions in this locality are subject to the action of so much moisture, the source of which is chiefly perspiration, except in uncleanly individuals whose urine is allowed to dribble over the parts, that in the place of being dry they become converted largely into mucous patches. Then to this element of moisture that of friction is added, which, as we have already seen, serves greatly to inflame the plaques. The bases of the sores therefore become infiltrated and raised. In aggravated cases hypertrophic changes set in and condylomata result, just as is the case under like conditions in connection with the foreskin and glans in the male and the external genitals in the female. Late gummata confined to the scrotum may occur very rarely. Commonly, however, when the scrotum is involved with late syphilis the process is one of extension, usually from the testicle proper; rarely from the epididymis, as has already been described.

Gumma primary in the scrotum might be confounded with phagedenic chancroid, chimney-sweep's cancer, a disease almost exclusively confined to Great Britain, and ulcerative conditions in connection with inflamed sebaceous glands.

THE FEMALE ORGANS.—THE VULVA.

The Initial Lesion.—In the case of the female the study and observation of the initial lesion are accompanied with much more difficulty than is experienced in the case of the male. This is largely due to the fact that the female, unlike the male, does not as a rule seek medical advice until secondary symptoms manifest themselves. The physician then usually makes his positive diagnosis from the general symptoms presented, a special inspection of the vulva being omitted, not only because the diagnosis can be made without it, but also because the patient is often shy, and, in fact, in many cases ignorant of the origin of her existing troubles. The reason for this frequent ignorance on the part of the female as to the source of her subsequent trouble lies in the fact that the initial lesion with her is often small and but slightly indurated, retaining, in fact, through all its phases of development the characteristics simply of the original abrasion. There is also no accompanying soreness or pain, consequently the vulva, owing to its unexposed position, unlike the penis, is not specially inspected, and the chancre passes unnoticed. In the case of the male, the medical observer can in most instances, by watching the development of the penile lesion, fairly accurately foretell from its characteristics the approach of syphilis; but with the female, even when the progress of the sore is carefully noted, there is often little to infer, owing to its slight development beyond the stage of abrasion. Fournier has observed a sore of this description make its appearance, undergo development, and disappear untreated in fourteen days, leaving behind no trace of its existence. R. W. Taylor has seen a similar instance occupying in his case eighteen days. Of course, the same pathological process takes place in these apparently insignificant lesions as has been described elsewhere with reference to the penile chancre. These slight initial lesions are often followed by very severe secondary manifestations.

The reason for this absence of noticeable induration in many cases is probably due to the fact that, owing to the structure of the parts, the surrounding lymph spaces are very spacious, hence the process of engorgement is not so great as to compress the walls of the blood-vessels and thus interfere with the circulation through the part infected. It must not be inferred, however, from what has been said, that with the female the initial sore is always insignificant, for it may take on all the extreme phases of development which we have studied with reference to the penis, even to sloughing and gangrene, as well as a more or less extensive and persistent œdema of the surrounding tissues. This last feature will, however, be considered by itself farther on. Then, again, these sores are not always nonsensitive and painless, as they sometimes give the individual afflicted much discomfort in both these particulars, as well as a persistent itching sensation which leads to extensive friction or scratching, and much consequent inflammatory infiltration of the parts involved.

As in the male, the site of the chancre is determined by the spot where the abrasion takes place. This is usually in connection with the labia majora or minora, together with the sulcus between them. Another frequent site is at the fourchette. Less frequently the vestibule, the clitoris and its prepuce, the free edge represented by the remains of the hymen, and rarely the mons veneris, serve to locate the lesion.

Secondary Syphilis.—These manifestations are at their commencement mucous patches, excepting rarely when squamous lesions appear on the labia majora and the labia minora, in case these last protrude sufficiently to be kept in a state of dryness. Such, however, is not usual, as not only the vaginal and uterine secretions but also the urine serve to moisten them. These mucous patches, unless subject to appropriate treatment, are liable to become inflamed, owing to the continuous moisture and decomposition of the secretions together with the important element of friction. Consequently, the bases of these lesions become infiltrated and elevated, and then, as a further step in the same direction, condylomatous masses sprout from the flat elevations, growing, however, more luxuriantly, owing, as has been already mentioned, to the greater amount of friction than is found in connection with the penis. Then, again, there is the element of general œdema, oftentimes of considerable extent, and much the same as occasionally accompanies the initial lesion in this region, which may be associated with these secondary manifestations. Ulceration may take place in the infiltrated and inflamed plaques and become quite a pronounced feature. This process can also attack the condylomatous growths and undermine them in an extensive manner.

Late Syphilitic Manifestations.—Before attempting to consider late manifestations in connection with the vulva, it is well to emphasize the fact in as clear a manner as possible, that until very recently, and to a certain extent still, the pathology of and consequently the differential diagnosis between chronic diseased conditions in this region have been most faulty. This field for study has been largely surrendered to gynæcologists, who have followed the teachings laid down in 1849 by Huguier (Mémoire sur l'Esthiomene, ou dartre rongeante de la region Vulvo-anale, Paris, 1849), and reiterated by French gynæcologists generally, and in England by men able in their line, such as West (Lectures on Diseases of Women, fourth edition) and Matthews Duncan (Edinburgh Med. Jour., July, 1884; Times and Gazette, November 15, 1884; Transactions of the Obstetrical Society of London, vol. xxvii, 1886, pp. 139, 230).

Huguier collected a number of cases, chiefly from a class of women dissolute and careless as regards their person, in which the vulva was usually involved by a brawny general inflammatory infiltration of a low grade associated with ulceration, sometimes very extensive. This condition was called esthiomene, or lupus. I well remember the late Sir Matthews Duncan calling my attention to just such a case in his ward at St. Bartholomew's, which he said was one of lupus of the vulva.

J. N. Hyde, of Chicago (Jour. Cut. and Genito-Urinary Dis., April and May, 1889), and R. W. Taylor, of New York (New York Med. Jour., January 4, 1890, and American Jour. of the Med. Sciences, February, 1890), both authorities well versed in syphilis and dermatology, have, however, recently appeared in forcible articles strongly and successfully attacking the old and prevalent ideas handed down by Huguier. In the first place, lupus vulgaris is considered from a dermatological standpoint. It is shown that Hebra and all dermatological writers of note since his time either fail to acknowledge the presence or deny the existence of lupus primarily involving the vulva, it being asserted by Hebra that lupus can involve the vulva only secondarily by a process of extension from the adjoining cutaneous surfaces. In most cases, also, lupus vulgaris shows itself first in childhood, a coincidence very different from what exists in the cases quoted by the followers of Huguier, as illustrative of vulvar lupus. Then, again, the individual ulcers in true lupus are small and superficial, while in this other condition they are often very extensive, frequently involving the deep structures which go to make up the very foundation of the parts. Microscopical investigations also fail to demonstrate pathological alterations such as one finds associated with lupus.

Hyde, in his article, after successfully excluding lupus as an agent of disease in this quarter, practically abandons the entire field to syphilis, giving to the late stage of this disease the credit—or, perhaps better, the blame—for all the appearances formerly ascribed to lupus. Taylor, however, as a result of great labor, extending over a long period and praiseworthy painstaking in a field generally rather unattractive, as most of his patients were dilapidated old prostitutes consigned to the wards of Charity Hospital, has not only eliminated lupus as Hyde did, but also has shown that several causes aside from syphilis may be held accountable for these chronic vulvar lesions. He, however, admits that syphilis is the agent in many of them. Taylor, in his article, arrives at the following conclusions, which I have thought well to reiterate here in his own words: "(1) That a large and perhaps the greater number of chronic deforming vulvar affections are due to simple hyperplasia of the tissues induced by irritating causes, inflammation, and traumatism; (2) that chronic chancroid is a cause in a certain proportion of cases; (3) that many cases are due to essential and specific syphilitic infiltrations; (4) that other cases are caused by the hard œdema which often complicates and surrounds the initial sclerosis and perhaps gummatous infiltration; (5) that many cases are due to simple hyperplasia in old syphilitic subjects who suffer from chronic ulcerations of the vulva long after all specific lesions have departed; (6) that some cases also in old syphilitics are due to simple hyperplasia without the existence of any concomitant ulcerative or infiltrative process, and seem to be caused by conditions which usually in healthy persons only result in vulvar inflammation."

After this digression into the literature of chronic lesions of the vulva, in order to bring the reader's mind into the proper groove, a description of the late lesions of syphilis in this locality can perhaps be the better understood. Sometimes this induration is confined to one or both labia on one side only. Then, again, both sides are involved, in which case they come together like buffers and serve to block the entrance into the vagina. When the tissues constituting the mons veneris are also infiltrated, the parts present an appearance which Hyde has likened to that of a horse-collar. Sometimes this induration asserts itself chiefly in connection with the perineal tissues. This last condition is more usual, however, in those cases where the perinæum has been the seat of injury in years gone by, generally during childbirth.

When induration takes place in the perineal region, it encroaches on the rectal walls often fully as much as on the vulva, and frequently interferes with the functions of the former organ. If, now, the induration persists during a considerable interval owing to a neglect of proper therapeutic measures, together with constant irritation due to friction and congestion of the parts from much moving about, and often to chronic vaginal discharges or urinary dribblings, the new elements of chronic œdema and hyperplasia are added to that of induration. As a result of this complex condition one expects hypertrophic growths or ulcerations. Often both these latter processes exist in a given instance. The hypertrophies frequently manifest themselves as thick, fleshy, tonguelike projections called by the French *languettes*. At times, however, the hypertrophy, although extensive, is more uniform, producing a condition which has been mistaken for a true elephantiasis.

When in these aggravated conditions the element of hypertrophy is not prominent, that of ulceration usually manifests itself. This ulcerative process may become very extensive. It can, at times when it involves the perinæum, entirely destroy the perineal muscular structure, causing fistulous communications and rarely utter destruction of the tissues between the vulva and rectum. Then, again, it may partially or wholly destroy the labia, or it may extend upward, involving the vestibule and the urinary meatus, at which times the act of urination may become very painful and difficult. I was once called to relieve a woman of retention of urine. Investigation showed an extensive ulceration of this nature to be the cause of her difficulty. Hyde speaks of cases of this nature where the ulceration around the meatus and the adjoining urethra was so extensive and destructive, that the end of the urethra, freed from its support, fell down over the vaginal opening. This destructive process, however (and the same may be said with reference to all late syphilis of the vulva), rarely encroaches upon the vaginal walls, although the cicatrization and contraction subsequent to ulceration may effectually block up the approach to the vagina.

It is well to mention the firm œdema of the vulva which at times is caused by syphilis. This œdema may be associated with the primary sore or with the secondary vulvar lesions. It generally involves the labia majora, although frequently the labia minora are implicated. It is quite persistent, lasting for some time after the associated lesion together with its immediate induration has disappeared as the result of treatment. Taylor claims that in the first, second, and even third years of syphilis occasionally an œdema of these parts occurs as the result of irritation from a chronic discharge, or from some traumatism, although no syphiloma is present; also, that these same irritating causes would not have produced œdema in these cases if the tissue of the vulva had not been affected by the syphilitic process. Of course, in the late syphilitic processes which have already been considered there is an element of œdema associated with the infiltration and hyperplasia, but as this element in these cases is subordinate to the other two, it has not been thought necessary to emphasize it in that connection.

Differential Diagnosis.—After what has been said regarding the initial lesion when associated with the vulva, it will be seen that oftentimes no definite conclusions can be drawn from the appearances presented, a positive diagnosis only being possible after the development of general secondary symptoms. Otherwise most of the points in differential diagnosis which have already been detailed in considering primary and secondary syphilis of the prepuce and glans penis apply in great measure to like conditions in connection with the vulva, though one must bear in mind the fact that syphilitic condylomata and likewise simple vegetations grow often luxuriantly when grafted on the vulva, and that eventually ulcerative changes, sometimes very extensive, may follow. Ulceration, however, is more frequent in connection with the syphilitic than with the simple hypertrophic condition. Then the element of œdema, often quite prominent, may complicate both primary and secondary lesions in this part. Persisting œdema here, however, is not confined to syphilitic conditions. It may be developed as a result of a traumatism, such as a blow or a kick, as an accompaniment to chancroids; also from friction and irritation in connection with any lesion, from a chronic irritating discharge, and from scratching due to pruritus.

Regarding differential diagnosis in connection with late syphilis in this locality, a few special remarks may be added to the more general ones made when considering late syphilis of the mucous membranous portion of the penis. In differentiating between tubercular ulcerations and late syphilis, it is well to bear in mind the fact that tubercular processes are very rare at the vulva, and when they do occur, which is usually in childhood, they are almost always secondary to uterine tuberculosis. Uterine tuberculosis generally proves fatal before the disease extends to the vulva, even in the few cases where the tendency appears to be in that direction. Taylor (American Jour. of the Med. Sciences, February, 1890) reports two cases of extensive and progressive ulceration originating at the vulva and afterward spreading to the tissues of the buttocks, thighs, and pubes, in subjects broken down by dissipation. Both these individuals finally died as a result of these extensive lesions. Taylor shows that these ulcerations were simple in character, syphilis and malignancy generally being excluded. It would be impossible, however, in such cases to make a diagnosis excluding late syphilis without a pretty intimate acquaintance with the antecedents of the patient and without histological examinations. Nothing need be said from a differential point of view regarding lupus, after the strong doubt cast on its existence in this locality.

SYPHILIS OF THE VAGINA.

This locality is peculiarly exempt from the manifestations of any stage of syphilis. Fournier states that he never saw a chancre situated beyond the entrance to the vagina. Taylor (New York Med. Jour., January 2, 1892), reports one case of vaginal chancre. Occasionally, where the os uteri is the site of the initial lesion, the process of induration may be so extensive as to involve the adjacent vaginal tissues. Gardillon (Thèse de Paris, 1881) has noted at the Lourcine, in the service of Martineau, a number of cases which seem to illustrate this condition. The reason for this peculiar exemption from the initial lesion of the vaginal structures is probably due to the density and toughness of its epithelial layers. The vagina likewise experiences a marked immunity from secondary and tertiary lesions. Secondary lesions, however, which are fairly common in connection with the os uteri, may sometimes, as in the case of primary lesions in the same position, involve to a moderate degree the adjoining vaginal structures by a process of extension. Spillman (Mém. Soc. Med., Nancy, 1881) records a case of late syphilis which involved the vagina. In this instance extensive ulcerations of the part were followed by cicatrization. This is apparently the only case of its kind on record. Gummata may occasionally, when involving parts near by, perforate the vaginal walls in discharging themselves.

SYPHILIS OF THE FEMALE URETHRA.

The initial lesion occasionally involves the meatus, in which position, according to Jullien, it is liable to be associated with much induration and some ulceration. At times the induration extends along the walls of the urethra for some distance, as is seen from time to time in cases where the male meatus is attacked in like manner. A chancre in this position may cause some functional disturbance. The female urethra may possibly be involved in like manner as the male urethra during secondary syphilis, but if such were the case, no subjective symptoms would be aroused to indicate this condition and thus direct special attention to this quarter. It is well known, however, that this part is occasionally attacked by an extension of late vulvar syphilis. Mention has already been made in that connection of the fact that occasionally the tissues serving to support the end of the urethra are destroyed. At such a time the urethral walls are much thickened and indurated. There can also be ulceration at the meatus, which very rarely may extend along the canal. Sometimes in these cases the hard indurated urethral tissues can be felt from the vagina. The caliber of the urethra may be so much occluded by these lesions that retention, more or less complete, may ensue.

SYPHILIS OF THE OS UTERI.

This part is much exposed to inoculation. Naturally the epithelium covering the neck of the womb is very tough, and if it is in a healthy condition at the time of exposure there is very little danger to be feared. It is very common, however, for the part to be eroded and granular, especially in the immediate vicinity of the uterine canal, as a result of endocervicitis, misplacement, former traumatism, etc., under which circumstances the syphilitic virus may easily get a foothold. The chancre in this position passes, as a rule, unnoticed, owing not only to its own indolence, but also to the marked nonsensibility of the parts. On this account the number of instances of chancre of the cervix noted in medical literature is far below what it should be. Schwartz (Ann. de Derm. et de Syphil., tome iv, p. 51) has made some creditable observations of chancre in this position. There seems to be nothing sufficiently characteristic in these initial lesions to allow in many instances a positive diagnosis. As the sore is constantly subjected to the action of moisture, it has a very macerated appearance. The surface is rarely red and granular, but is usually covered by a thin layer of exudative material which can with more or less difficulty be scraped off, leaving a glazy, denuded surface. This film of exudative material is of a gray color, though it may incline somewhat to yellow, and in some cases where the surrounding tissues are very much engorged there may be some surface sloughing in connection with the film, in which instances a greenish tinge may be imparted to the general gray coloring. The film also, where there is more or less sloughing associated with the process of exudation, no longer seems thin, nor can it be scraped off. In the great majority of instances the chancre involves the central portion of the os about the opening of the cervical canal, though rarely it may be eccentric. The amount of induration associated with the sore in this situation is very variable. Often it is slight, and at the same time difficult to estimate, unless the organ be drawn forward by means of a tenaculum where it can be easily felt or pinched between the forefinger and thumb. Occasionally, however, the induration may be so extensive and dense that the whole lower portion of the cervix is hard and gristly, and at the same time very pale. It is in such cases that some surface sloughing may take place.

Secondary syphilitic manifestations on the os uteri are quite common. There is, however, nothing in their appearance oftentimes to differentiate them from the ordinary erosive and superficially ulcerative conditions so common there as the result of chronic diseased conditions of the womb.

A. Martin (Ann. Derm. et Syphil., 1877–'78, p. 399) has described a hypertrophic ulcerative condition of the os which he ascribes to secondary syphilis. His conclusions, however, lack subsequent confirmation, and can not therefore at present be fully accepted. Late syphilis in connection with this part seems to be very rare, as hardly any mention is made of it in the literature of the subject. Jullien relates having observed a gumma the size of a walnut involving the cervix, at the Lourcine Hospital in the service of Fournier. That this tumor was a gumma was proved by its disappearance under appropriate treatment.

Differential Diagnosis.—Little need be said on the subject of differential diagnosis between syphilitic and other conditions involving this part, since the primary and secondary manifestations usually are so lacking in any special characteristics that a positive diagnosis can only be made in the first instance by awaiting general developments, and in the second by finding other contemporary lesions which confirm those existing on the os. Of course, where any suspicious growth or extensive ulceration involves the cervix, it is well, in the absence of a microscopical examination of a section of the tissue under observation, to make a trial of treatment directed against syphilis. One should bear in mind, also, that chancroids can involve the os. They might be mistaken for primary or secondary syphilis. The soft sore, however, extends more rapidly and more deeply than is usual with syphilis. The parts, also, are actively inflamed and considerably swollen. Besides, the element of auto-inoculation generally asserts itself, the vulva being attacked. Then, too, the painful sensations associated with chancroid when at all extensive are in strong contrast to the negative sensations corresponding to syphilis.

SYPHILIS OF THE BODY OF THE WOMB, THE TUBES, AND THE OVARIES.

Syphilis in connection with these parts is almost unknown in literature, aside from a few random observations which mostly lack authenticity. Gynæcologists apparently almost entirely leave it out of their calculations in the diagnosis of disease in this connection, and pathologists seem to have failed so far to find more than a few stray traces of its existence. Perhaps the ovaries are affected during secondary syphilis in a manner corresponding to the epididymis, but of this there could naturally be very little proof. Oftentimes women during the secondary stage of the disease suffer from functional disturbances in menstruation which are probably largely due to the general *malaise* associated with the early general symptoms; still, they may be in some measure dependent on local manifestations. The ovaries and tubes are rarely the seat of late syphilitic lesions of a gummatous nature. It has been questioned whether some of the sclerotic changes which are observed in connection with the ovarian connective tissues may not at times be due to syphilis, the same as in the testicle. This question has not as yet been settled, though it is very probable that some of these conditions are syphilitic in origin.

Richet (Traité pratique d'Anatom. Chir., fifth edition, p. 701) records a well-authenticated case of gumma of the ovary. Lancereaux also has been quoted to have observed a well-defined tumor of the ovary which disappeared speedily after the introduction of antisyphilitic treatment.

A case of gummatous salpingitis has been put on record by Bouchard and Lépine (Gomme des Trompes, Gaz. Méd. de Paris, No. 41, 1866). In this case both tubes were involved, and thickened to the diameter of the finger. On exposing them by means of an incision three gummata about the size of a hazelnut were found connected with each tube. The canal was obliterated in each instance. Some time since I was called to treat a young woman of doubtful antecedents who announced that she had a pelvic inflammatory trouble, which was gradually getting worse in spite of the treatment she had received. Bimanual palpation disclosed in the region of the left broad ligament a tumor about the size of an orange moderately tender. As she had already been under the treatment of a good gynæcologist without favorable results, I put her on large doses of iodide of potash, although I could not obtain, notwithstanding the many opportunities she had apparently had for contracting the disease, a history of syphilis. The patient began immediately to improve, however, and after a time, the treatment being continued, the tumor gradually disappeared. Although this case does not absolutely prove syphilis of this region, still it justifies one in strongly suspecting that such was the case.

SYPHILIS OF THE PLACENTA has been considered under another heading.

II. SYPHILIS OF THE BLADDER.

This is another organ which is rarely disturbed by syphilitic processes. It may be that the vesical mucous membrane is at times superficially attacked during the secondary stage, but, whether this be so or not, there are no subjective vesical symptoms associated with secondary syphilis. Now that the interior of the bladder can be so easily and accurately explored by means of the cystoscope, it will be a simple matter in the future to definitely settle this question.

The vesical walls are apparently rarely the seat of gummata. Possibly a considerable percentage of the so-called perforating ulcers of the bladder walls are of this nature. Then, again, gummatous processes originating in neighboring organs may, by reason of extension, become at first adherent to the vesical wall, and then later, as the central process of liquefaction and disorganization progresses, break through the walls discharging into the bladder. Under such conditions a fistulous passage persists, connecting the center of the gummatous cavity with the bladder. Proksch (Vierteljahresschr. f. Dermat. u. Syph., Wien, 1879, vi, p. 555) has written an extensive article on the history and pathology of syphilitic ulceration of the bladder, in which a number of cases apparently illustrative of gummatous involvement of the vesical walls are recorded. There is, aside from Proksch's article, very little literature of moment on this subject.

III. SYPHILIS OF THE KIDNEY.

Early English writers, among them Gregory and Wells, observed renal disturbances during the course of syphilis. These authors ascribed these disturbances to the action of the mercurials administered for the syphilis, and not to the disease itself. Rayer, however, in 1840, showed that mercurials did not cause kidney disturbances, aud asserted that the associated renal troubles were due to the syphilis. These ideas have since that time prevailed. Until quite recently little attention has been paid to syphilis in connection with the kidney, but of late very many careful observations have been recorded, so that at the present time one finds much valuable literature bearing on the subject. The kidney may be attacked by syphilis at any time during the course of the disease, though the nature of the resulting lesions varies much, according as they correspond with the early secondary or late stages. It seems well, therefore, in treating this subject, to subdivide it under two headings, of early secondary and later syphilis of the kidney. Then, again, inherited syphilis may attack the kidney. This subject of kidney involvement from inherited syphilis will be treated later on.

Early Secondary Syphilis of the Kidney.—The attention of the profession was first called to this special condition by Jaccoud in 1864, who in his clinical observations, page 712, records two cases. Perroud, however (Jour. de Méd. de Lyon, 1867, p. 115), in 1867 gives the first careful descriptive history, based on two cases which had come under his notice. Since that date many authorities, chiefly French, have recorded similar cases, so that now it is a well-settled fact that the kidneys during the early general invasion of syphilis are subject to attack much in the same way, for instance, as during scarlet fever, although with scarlet fever the kidney complication is much more frequent than with early syphilis. Petersen (Brit. Med. Jour., October 3, 1891), after an apparently quite extended investigation, concludes that the kidney is affected during the secondary period in 3·8 per cent of cases.

The general characteristics of this form of nephritis are usually as follows: It first manifests itself during the second and third months after the development of the chancre in the great majority of instances, though rarely it may occur somewhat earlier or even later than this period. The advent of the trouble is commonly very sudden, there being no prodromal symptoms. It manifests itself by an œdema usually of the face, sometimes of the legs, scrotum, and elsewhere. This œdema oftentimes extends very rapidly. It may become excessive and be of itself the direct cause of death, as in cases where acute œdema of the lungs develops. Aside from the œdema and its resulting inconveniences there are usually no subjective symptoms.

Occasionally the patient's attention is directed to an undue frequency of the urinary act, sometimes even before the œdema manifests itself, though it is very rare for any pain to be associated with this frequency. Then, again, there may be feelings of general *malaise*, but as these symptoms are so usually associated with the early stages of syphilis they can hardly be ascribed to the kidney inflammation even when they do exist. Rarely, however, there may be pain in the kidney region on one or both sides, and once in a while sharp, darting pains, which may be severe enough to cause the patient to take to his bed. Headache also has been known to be a feature, as well as disturbances of vision, digestion, etc., such as one might expect to accompany an ordinary acute nephritis. There is one feature, however, which is usually absent in this trouble, although present for the most part to a rather marked degree in ordinary acute nephritis, and that is fever.

From this description it will be seen that the subjective symptoms of acute syphilitic nephritis, aside from the œdema, are as a rule most sluggish and dormant. The signs furnished by careful examinations of the urine at regular intervals are important in this as well as other forms of nephritis. In fact, it is well, as numerous authorities have already pointed out, to examine the urine of all syphilitics, especially during the secondary stage of the disease. The urine in acute syphilitic nephritis, when the disease is on the increase, is small in amount, usually turbid and high-colored, or dark in case sufficient blood is present. There is also considerable albumin, especially if there is much blood. The microscope reveals abundant renal epithelia, blood-corpuscles, granular *débris*, and casts, which are for the most part granular, though some of them may have so many blood-corpuscles and epithelial cells adhering that they pass respectively for blood and epithelial casts.

Negel (Thèse de Paris, 1882) also has called attention to the presence, in a case which he carefully examined, of numerous micrococci. This last fact will be considered again, later on, in classifying this form of nephritis. Then, when this disease is on the decrease, especially in cases where the œdema has been abundant, the urine becomes lighter in color and specific gravity and increased in volume. The sediment, as seen by the microscope, is less, and somewhat changed in character. The blood by degrees decreases and finally disappears, as do also, though more slowly, the epithelial and granular elements.

Hyaline casts gradually, and at last, as resolution approaches, wholly take the place of the granular ones. This process of resolution is not always continuous, but may be interrupted by numerous relapses. Finally, however, in the majority of cases where proper treatment is adopted, all pathological evidences disappear from the urine, though a faint trace of albumin often lingers, or reappears from time to time long after all other evidences of the preceding attack have disappeared. Occasionally, also, the pathological evidences fail to disappear from the urine. In such cases the acute trouble is the forerunner of a chronic diseased condition. This mishap occurs frequently in cases where treatment has been neglected or not tolerated. In ordinary instances, where proper treatment is applied early in the course of the disease, thorough convalescence is established in from one to three months.

As most of the cases illustrating this form of nephritis recover, it is seldom that the opportunity to make pathological investigations presents itself. Still, enough has been done in this respect to pretty well determine the pathology. Negel (Thèse de Paris, 1882), in his excellent thesis, thoroughly considers this point. As a result of the perusal of the pathological literature, the following statement can be made: The kidneys are generally increased in size, and are often described as large, white kidneys. The capsule appears normal, and is not more adherent than it ought to be. On exposing the kidney substance by means of the usual vertical incision, it will be seen that the thickness of the cortical area is considerably increased. It also presents a general grayish appearance, with here and there darker spots, suggesting congestion, together with light-colored streaks. The medullary portion is normal in appearance. Under the microscope the convoluted tubes seem to be the part most affected. The large, straight collecting tubes are often somewhat catarrhal. The tubes of Henle are normal. The epithelial cells of the convoluted tubes are much swollen and granular. Their edges are often obliterated, numerous cells being soldered together as one mass. Then, again, in places the tubes are blocked by the detached masses of epithelia, together with colloid material and blood-cells. The glomeruli often appear normal, though they may be filled with blood or colloid material, or both. There may also be considerable œdema of the connective tissue, due to pressure on the capillaries resulting from the changes in the convoluted tubes. Of course, if the condition thus described persists for a long interval in any marked degree, chronic inflammatory changes in connection with the renal connective tissue would naturally follow.

Bouchard (Medical Congress, London, 1881), in 1881, asserted that this form of nephritis bore the same relation to syphilis that scarlatinal nephritis did to scarlet fever; in fact, that it was an infectious nephritis due to direct renal irritation caused by the elimination of the bacteria of syphilis. In 1882 Negel reiterated in his thesis this idea. He also reported finding bacteria in the urine of one of these cases. He further stated that in the microscopical study of such cases the kidney in the fresh state would show bacteria in the connective-tissue spaces and in the canaliculi. Lecorché and Talamon (La Méd. Moderne, Paris, September 10, 1891) also adopt this theory, that syphilis may affect the kidneys in like manner as many other micro-organismal diseases. This idea now seems to be fairly well established. The general study of acute bacillary nephritis is as yet young, though Mannaberg (Zeitschrift f. klin. Med., Berlin, Bd. xviii, Heft 3, 4) and others, by their investigations, are rapidly making a prominent place for it in medicine.

After what has been said, the question of *diagnosis* in cases of this kind need give little trouble. The sudden œdema would naturally attract attention to the kidneys, and the examination of the urine would verify the previous suspicions. Then the presence of recent syphilis would cause mercurial treatment to be prescribed, which, if properly administered, should soon check the disease and hasten resolution. An acute nephritis from another cause would not be favorably influenced by mercurials. There is a point in connection with the administration of mercurials in these instances which it seems well to mention here, although this article properly does not deal with the question of treatment, and that is, that oftentimes these cases are very quick to show the constitutional effects of mercury in the mouth. Several authors have laid stress on this point. Descoust (Thèse de Paris, 1878) and Negel (Thèse de Paris, 1882) both record cases of mercurial stomatitis, often of a marked degree, following the first administrations of the drug. Petersen (Brit. Med. Jour., October 3, 1891) states that when the gums of syphilitics are readily affected by the administration of mercurials attention should always be directed to the kidneys, with the expectation of finding them more or less involved by the disease.

The *prognosis* should, as has been stated, in this form of trouble be favorable, yet occasionally, even under the most approved treatment, death ensues, and such a result is not unusual when treatment is neglected. When, in addition to this, one considers that every now and then the acute condition is the origin of a chronic nephritis, it would seem to be the part of wisdom to make a somewhat guarded prognosis.

Late Syphilitic Lesions of the Kidney.—Late lesions of the kidneys due to syphilis are not very rare. They are more common than the early ones, which have just been considered. Petersen (Brit. Med. Jour., October 3, 1891) states that 5·8 per cent of patients with late syphilitic manifestations have associated disease of the kidney. The same author found kidney lesions 34 times out of 788 autopsies in subjects where a previous history of syphilis existed; and in 36 cases where the results of syphilis were the cause of death, 7 yielded to chronic nephritis. Mauriac (Rev. de Thérapeutic., Méd. Chir., February 15, 1889) asserts that syphilitic renal changes stand in the fifth or sixth place in the order of visceral syphilis.

These lesions give rise to symptoms such as are usually associated with chronic renal disease. The symptoms vary according to the exact pathology of the existing lesion, though there is nothing peculiar to syphilis in contradistinction to other causes by which to distinguish them.

The pathology of these lesions is interesting. It does not consist of one process producing a uniform series of appearances, but of three separate ones, namely, amyloid degeneration, chronic inflammation of the interstitial tissues, and gummatous formation. Fatty parenchymatous changes are also often associated especially with the amyloid degeneration; but as these fatty parenchymatous degenerations are subsequent to and apparently dependent on one of the three processes just alluded to, rather than the syphilis, it has hardly seemed correct to classify them among the changes due directly to syphilis. It is not customary to find one of these first two processes existing in a given case to the total exclusion of the other, as they seem to occur in most instances associated sometimes quite equally, while at other times one or the other of them predominates in varying degrees. Jaccoud (Gaz. des Hôpitaux, October 23, 1888) states that amyloid degeneration is more frequent than interstitial inflammation in connection with the kidneys in late syphilis, he having found it in thirty-five out of forty-two cases. Bamberger (Volkmann's Samml. klin. Vortr., 1879, No. 173), in forty-nine examinations, found amyloid degeneration the feature in twenty-nine cases and interstitial inflammation in sixteen. Mauriac (Rev. de Thérapeutic Méd.-Chir., February 15, 1889), however, asserts that the interstitial inflammation is the more common. The question is, therefore, not satisfactorily settled. Some pathologists also hold that a kidney which at first was amyloid eventually may become interstitially contracted, having lost most of its amyloid elements, or, in other words, that the interstitial process may be a stage of syphilitic development later than the amyloid.

Gummatous changes in this connection are much rarer, apparently, than the other two. They represent frequently the latest stage of syphilis. They are, however, always associated with interstitial inflammatory changes, and the site of a previous gumma is marked by a firm cicatrix formed by the associated interstitial inflammation.

When amyloid degeneration is the lesion involving the kidney, that organ is of the large white variety often called lardaceous, especially when there is much fatty parenchymatous degeneration associated. It has previously been stated that the kidney, when affected by early syphilis, is increased in size, and is frequently described as a large white kidney. In this acute condition, however, the organ is not lardaceous, but quite nearly resembles the condition of cloudy swelling, with which we are all so familiar, occurring after some infectious condition, as, for instance, typhoid fever.

The urine in cases of amyloid degeneration is usually but little increased in volume at any time, and it is often quite scant. It contains, besides, considerable albumin, hyaline and waxy casts, with, in many cases, fatty degenerated cells and free fat-globules. When chronic interstitial inflammation is the principal lesion, the kidney is small, hard, and knobbed with a dense adherent capsule. The volume of urine is increased, often to a considerable extent. The specific gravity is very light. There is present but little albumin, at times only a small trace. The sediment is slight, and consists of a stray hyaline cast.

Between these two extreme conditions just described the kidney may present many varying appearances when affected in unison by these two chronic syphilitic processes, according to the proportions in which they exist in any given instance. When extensive amyloid degeneration involves one kidney, the other organ is affected apparently in like manner, though it may be to a less degree. This same statement, however, when applied to chronic interstitial syphilitic nephritis, though true for the great majority of cases, still has exceptions. In other words, one kidney may be rendered valueless by this atrophic condition while the other is spared. In most instances of the kind the sound kidney undergoes a compensatory hypertrophic change. Wagner (Morbus Brightii, 1882) records six cases apparently illustrative of this condition, and Weigert (Volkm. Samml. kl. Vortr., 1879, Nos. 162, 163, 326) two. I myself have seen one case which seemed to be of this nature.

James Israel (Deut. med. Woch., January 7, 1892) also records an extremely interesting case of this description, where the offending kidney was removed, the patient making a good recovery. This case will be considered again later on. In Israel's case, however, the affected organ had not at the time of operation reached the stage of atrophy such as has usually been observed at autopsy. In some of these cases, where a unilateral atrophy of the kidney exists the early pathological process is probably partially gummatous, rather than a pure and simple chronic interstitial inflammation.

Frerichs (Die Bright'sche Nierenkrankh. und deren Behandlung, Braunschweig, 1851) and some others have held that the amyloid degenerative change found in connection with the kidneys of individuals who have suffered from syphilis bear no direct relation to the syphilis itself. They declare that amyloid degeneration results only from a state of general cachexia, and that when syphilis or any other chronic disease so reduces the system as to bring about this general condition, then amyloid degeneration will result. This theory, however, has been shown not to hold good, at least in very many cases, for oftentimes this form of trouble is found in syphilitics who have always been most healthy and vigorous. In such cases the amyloid degeneration may not be a general process attacking all the viscera, but localized in the kidneys or some other organs.

Gumma of the kidney is somewhat rare, as has been stated. Jaccoud (Gaz. des Hôpitaux, October 23, 1888) reports it seven times out of forty-two cases of late syphilitic disease of the kidney. Most authorities, however, consider this complication much less frequent than the figures of Jaccoud would lead one to suspect. It is generally localized in one organ, though it is not usual for both to be attacked. In most instances this form of trouble had not been suspected during life, there oftentimes being no subjective symptoms and nothing in the urine to attract the attention, at least of the ordinary observer, the autopsy first of all revealing the presence of the lesion. On account of this dearth of symptoms, it may be that gumma of the kidneys is more common than it is at present generally supposed to be. In cases, however, where the disease is extensive, where it is associated with much interstitial inflammation, and where it involves the pyramidal portion of the kidney, the urine does not remain normal, but shows some albumin together with granular detritus, hyaline and granular casts, some renal epithelia and stray pus-corpuscles. There may also exist localized subjective symptoms, very rarely marked in character, as occurred in the case recorded by Israel (Deutsche med. Woch., January 7, 1892), where an extensive gumma of the kidney pointed externally, and on being incised discharged itself through the flank, leaving a permanent sinus. Of course, where the kidney structure is extensively involved bilaterally by this pathological process there would result general disturbances, such as one ordinarily sees in cases where the excretory function of the kidneys is at fault.

According to Cornil, gummata occupy commonly either the cortical substance of the kidney or the pyramids, rarely both situations in a given instance. They appear as pale-yellow nodules, sometimes no larger than the head of a pin, commonly about the size of a pea, though one may be large enough, as in Israel's case, to be felt externally as a good-sized tumor. They are usually multiple, Cornil having observed as many as twenty, and Axel Key eighty, in connection with a single kidney. In such instances the kidney presents a mottled appearance. If the process continues unchecked, adjacent gummata tend to coalesce by involving the intervening tissues. In this manner considerable areas of surface become destroyed. It has already been stated that interstitial inflammation is associated with the gumma. This inflammation, however, need not be in this instance a general process involving the whole organ, as it ordinarily does, but it usually occurs localized about the periphery of the gumma. One does not expect to find amyloid degeneration associated with a gummatous condition; still, such a combination may occur, Cornil in his thesis of 1864 having recorded it. In cases where a gummatous process which has been extensive, finally ends in cicatrization, there may be left a portion of the kidney which remains healthy and functionally active. Key (Hygiea Forh., 1877, p. 85) has observed such an instance, the lower portions of both kidneys being atrophied as a result of previous gummata, there being at the time of death an active process in connection with the wall of the heart. In Israel's case, also, already referred to, the kidney at the time of removal showed a gummatous condition of the lower part only in which atrophic changes were commencing.

Wagner refers to an acute nephritis which sometimes grafts itself on kidneys already affected by chronic disease due to previous syphilis. Such a condition of affairs he considers very serious. Out of eight cases observed, five resulted fatally. In the fatal cases, where an examination of the kidneys was afterward made, an acute congestion with a marked hæmorrhagic tendency was found complicating the chronic condition. The cases in which recovery occurred gradually reverted to their former condition.

It has not seemed necessary in this article to describe minutely the chronic pathological processes which attack the kidney as the result of late syphilis, since such a description can be found in all works on general pathology.

Prognosis.—As regards prognosis, the chronic interstitial inflammation is the worst. It can not be influenced to any extent by treatment, and in all cases where it is general, involving both kidneys, the result is eventually fatal, though the period taken to accomplish this may be considerable. The prognosis in the case of amyloid degeneration of the kidneys, although grave, can still be hopeful, provided the amount of associated interstitial inflammation is slight, for under judicious antisyphilitic treatment at times the amyloid material seems to disappear, leaving little or no trace of its former existence. This process of resolution from an amyloid condition is, however, at best a slow one. The gummatous condition allows of a better prognosis than the other two, since it is in most instances a localized process, and nowadays it is well known that individuals get along very well indeed after the loss of half their urinary secreting tissues. Gummatous deposits in the kidney, as elsewhere, gradually melt away and disappear under the proper medication, the only difficulty being that in many cases they do not give enough evidence of their existence to occasion the administration of the required treatment.

I think well of mentioning here somewhat in detail the article of James Israel, several references to which have already been made, since it offers numerous unique features. The histories of two cases are given, in both of which nephrectomy was resorted to, owing to subjective symptoms and enlargement in connection with the kidney. Both individuals had a history of previous syphilis, and in the case of both the removed organs it was found that chronic syphilitic processes were the cause of all the trouble, and consequently, had a sufficiently prolonged and thorough antisyphilitic treatment, as the author acknowledges, been resorted to, operative measures would in all probability not have been required.

In the first case a large, rather nonsensitive tumor existed on one side, evidently connected with the kidney, since the urine showed inflammatory disturbances, and manipulation of the mass largely increased the sediment in the urine and caused some blood to appear there also. Deep, firm pressure on the tumor was marked by a corresponding indentation, which persisted for a time. Although the patient was improving and the tumor getting smaller under antisyphilitic treatment, still nephrectomy was performed and the tumor removed. This was found to consist externally of a hard, chronically inflamed swollen mass of perinephritic connective tissue highly œdematous. The capsule of the kidney also was involved in this same chronic process. It was this perirenal inflammation which made up the bulk of the tumor, for the kidney itself was not found to be enlarged, but rather atrophied, and presenting a condition of chronic interstitial nephritis. The remaining kidney must have been perfectly healthy, as the patient was entirely cured by the operation. This case is not only clinically interesting, but also pathologically, owing to the fact that the syphilitic process attacked the perirenal structures—a new feature, and one which has not been before observed, at least prominently, to my knowledge. Whether these perirenal structures were attacked primarily or subsequently to the kidney would be an interesting question.

The second case, when it came under the author's notice, presented a fistulous opening in the left flank, which evidently connected with the kidney. There had previously been a history of a fluctuating tumor in that region which had gradually worked its way toward the surface. It had then been incised, the diagnosis being abscess of the kidney. Israel performed nephrectomy, and discovered the remains of an extensive gumma which occupied the lower portion of the kidney. The patient made a good recovery. If this tumor had not been incised it would eventually have discharged of its own accord through an opening in the flank. It is easy to imagine other similar extensive gummata of the kidney which might, like extensive abscesses of the part, discharge themselves into the bowel or the thoracic cavity, though no one has yet, to my knowledge, recorded such instances.

HEREDITARY RENAL SYPHILIS.

Syphilis, when at all active in one or both of the parents, is, as is well known, very fatal to infants, a large percentage of those which are born alive dying about the time of birth or shortly afterward from the effects of the disease on the vital organs. Jullien (Rev. Mensuelle des Mal. de l'Enfance, Paris, July, 1891) relates the histories of two hundred and six cases of pregnancy contaminated by syphilis more or less active, and calls attention to the great mortality. Many pathologists, among them Klebs, Virchow, and Lancereaux, have found, on post-mortem examination in some of these cases, disease of the kidneys, together, generally, with disease in connection with other organs. It is not probable, therefore, that syphilis in such instances confines itself very strictly to one organ, but is rather general in its determinations.

Pathologists still have much work to do in this field, as most of the ideas are based on gross pathology. In some cases, where, from the symptoms during life, there was reason to suspect that the kidneys would be found involved, these organs to the naked eye have presented no special lesion. Then, again, when abnormal appearances are presented, these appearances do not seem to be very uniform. Klebs states that it is common under such conditions to find the kidneys pale and firm, presenting evidences of interstitial inflammation. Virchow has seen such kidneys enlarged, friable, light yellow in color, and dotted in places with reddish and brownish spots, indicative of former hæmorrhages. Such a description would lead one to suspect a large element of fatty degeneration. Lancereaux is inclined to think that a granular degeneration of the epithelial cells of the convoluted tubes is an important feature.

In all probability, if sufficiently prolonged investigations were made in this field, all the pathological evidences which we have already considered in reference to the kidney in connection with the acquired form of the disease, from the acute bacillary nephritis to the gumma, would be found in these infantile cases. If the kidneys, in cases of inherited syphilis, are attacked later in life, it is usually before puberty. In such instances one expects to find a condition of amyloid degeneration.

SYPHILIS OF THE NERVOUS SYSTEM.

By B. SACHS, M. D.

Introduction.—Syphilitic infection is a most potent factor in the development of many acute and chronic disorders of the nervous system. The late manifestations of syphilis are exhibited as frequently in the nervous system as they are in the eye, the liver, or the osseous system. There is good reason to believe that the syphilitic diseases of the nervous system are steadily increasing. This is due not to an actual increase of syphilis in general, but to the more frequent association of syphilis with other potent factors in the causation of nervous disease—namely, excessive work, worriment, and the alcoholic habit. The co-operation of several causes is often overlooked.

It is quite useless to enter upon a discussion as to the secondary or tertiary character of syphilis of the nervous system. It is a late development of constitutional syphilis, and that is sufficient. These syphilitic disorders of the brain, the spinal cord, and the peripheral nerves appear at varying intervals after the initial infection. Heubner, in his excellent article in Ziemssen's Encyclopædia, tabulates numerous cases in which he was able to ascertain the interval between the date of the initial infection and the appearance of syphilitic nerve disease. In some cases nine months sufficed for the development of brain syphilis; in the majority a period of more than three years intervened; and in some, thirty years had elapsed since the time of the initial infection. My own experience has impressed several points upon me: first, that those who acquire syphilis when comparatively young (say under twenty-five) are more apt to develop cerebro-spinal syphilis; secondly, that in such subjects syphilitic nervous disease is apt to appear within two or three years after the initial infection; and, lastly, I have been convinced, rather against my former views of the duality of the syphilitic lesion—that syphilis of the nervous system appears not infrequently after soft chancre without the customary secondary eruptions. This is particularly true of cases of tabes and of ocular palsies.

The question arises, whether syphilis of the nervous system is due to improper treatment during the initial period. This can be answered in the affirmative for the majority of cases. Some of the worst cases of syphilitic dementia and of general paresis in young subjects that I have seen have affected persons who, for reasons of shame or from ignorance, sought no medical advice in the earlier periods of the disease; while, on the other hand, I have in my records the histories of young men who have had treatment for years, have made annual pilgrimages to Hot Springs or Aix-la-Chapelle, and who, in spite of all treatment, have developed tabes, ocular palsies, or even general paresis at the end of a few years. Much evidently depends upon the intensity of the initial infection, though I wish also to record the further impression that nerve syphilis frequently enough appears after a very slight initial infection, and without the development of secondary symptoms in any other organ or system of the body.

How can we diagnosticate the syphilitic character of disorders of the nervous system?

1. By proving the existence of other symptoms of constitutional syphilis; by the occurrence of such accidents in the history of the patient as are known to be due to syphilis (miscarriages, stillbirths, etc.). This may lead to error, for persons with constitutional syphilis may suffer from any other of the diseases and accidents to which the nervous system is liable, or persons with undoubted syphilitic nerve disease may reveal no other symptoms of constitutional syphilis.

2. By exclusion of all other possible causes. This would be difficult indeed to establish, were it not for the fact that many of the cerebral and cerebro-spinal lesions not due to syphilis occur only at definite periods of life, whereas syphilitic lesions may occur at any period. Thus cerebral hæmorrhage or thrombosis (with the resulting hemiplegia), if it occurs before the age of forty-five and if it is not of traumatic origin, is most apt to be due to syphilis. It is true also of any case of apoplexy or of epilepsy coming on in young persons between twenty-five and forty-five years, that, if not due to trauma or heart disease, it is probably syphilitic.

3. By showing the analogy between the symptoms presented by the patient and definite clinical pictures which are known to be due to syphilis. This furnishes by far the most valuable proof to be obtained; it should enable us to make the diagnosis of syphilis of the nervous system without even inquiring for the suspected etiological factor.

4. By the result of antisyphilitic treatment. This is of value in some cases in which the response to treatment is unusually prompt; but the argument is often fallacious, inasmuch as undoubted syphilitic disorders often do not yield to specific treatment, and, as I shall show by a post-mortem examination to be recorded later on, diseases which are not syphilitic may exhibit remarkable remissions under antisyphilitic treatment.

I consider it to be my chief duty in this article to pay special attention to the point mentioned in the preceding paragraph 3, which will necessitate a very careful study of the symptomatology of syphilitic diseases of the nervous system.

Such studies have been made without number for the past centuries. (The older literature of this subject can be found in the article by Heubner in Ziemssen's Cyclopædia and in Rumpf's Monograph.) The medical history of this subject goes back as far as Ulrich von Hutten, who is supposed to have been the first to recognize the importance of syphilis in the development of paralysis and apoplexy. Paracelsus, Astruc, Van Swieten, and others, considered syphilis to be the mysterious cause of any and many disorders of the nervous system. Hunter went to the opposite extreme of declaring that neither the brain nor the abdominal viscera is ever subject to syphilitic disease. Hunter's views obtained general credence and were practically in force until Virchow showed that a certain peculiar infiltration of the meninges, and the development of gumma in the skull and in the cortical tissues of the brain, were due to syphilis.

Virchow (in Virchow's Archives, vol. xv, in his monograph on tumors, and in numerous other publications) also established the importance of granulation tissue in all morbid processes due to specific disease. Steenberg (Den syph. Hjirnelideloefs, Copenhagen, 1860) was the first to lay special stress upon the fact that the disease of the blood-vessels was of greatest importance in the development of syphilitic disease of the brain and spinal cord. Heubner, to whose work in this special field all later authors are greatly indebted, insisted that the changes in the arteries started from the endothelium, and since the publication of his monograph specific endarteritis has been considered the most frequent condition in all specific diseases of the brain. Köster (Sitzungsber. der niederrh. Gesellsch., etc., 1875) and Friedländer (Centralbl. f. d. med. Wissensch., 1876) opposed this view of the *rôle* played by the endothelium, and Baumgarten (Virchow's Arch., vol. lxxiii) insisted that the morbid process began in the connective tissue of the adventitia; while Rumpf (Monograph, Wiesbaden, 1887), who has written the most extensive monograph within recent years on this subject, attributes the most important *rôle* to the muscular coat of the arteries, from which, in his opinion, the granulation tissue is apt to emanate. The purely pathological discussion of this subject was for a time superseded by the excellent clinical studies of Charcot (Charcot et Gombault, Journal de la Physiol., vi, 1863; Arch. de Physiologie nom. et path., 1873), Jackson (Journal of Mental Sciences, 1874 and 1875), Fournier (La Syphilis du Cerveau, monograph, Paris, 1883), Greiff (Arch. f. Psych., vol. xii), Westphal (Arch. f. Psych., vol. xi), Schmauss (Arch. f. kl. Med., vol. xxxiv, 1889), Oppenheim (Berl. kl. Wochenschr., 1888; reprint of lecture, Berlin, 1890), Strümpell (Deutsch. med. Wochenschr., 1889), Erb (Neurologisches Centralblatt, 1892), Siemerling (Arch. f. Psych., vols. xix and xx), Eisenlohr (Neurologisches Centralbl., 1884), and others too numerous to mention.

The question of the relation of syphilis to tabes has led to researches which have thrown much light upon the general syphilitic disorders of the nervous system. In this special field Fournier and Erb (see Erb's recent and conclusive papers in the Berl. kl. Wochenschr. for 1891 and 1892) have insisted on the causal relation between syphilis and tabes, as proved by the extraordinary percentage of syphilitic cases among tabic patients, while Westphal and Leyden (Charité, Annalen, 1876, and Berl. kl. Wochenschr., 1892) have denied that tabes was due to syphilis.

In this country very few contributions have been made to this special subject. In recent years, Gray (Med. News, 1887), Wood (Transact. of Coll. of Phys., Phil., 1884), and myself (N. Y. Med. Journal, 1891) have contributed clinical and pathological articles.

THE PATHOLOGICAL ANATOMY OF SYPHILIS OF THE NERVOUS SYSTEM.

General Considerations.—It is now well established that the morbid processes in the nervous system due to syphilitic infection may involve, 1, the bony parts inclosing brain and spinal cord; 2, there may be syphilitic neoplasm of the nervous system and its coverings; 3, we may have syphilitic disease of the larger vessels.

Very little need be said about the specific processes beginning in the bony parts surrounding the central nervous system, and secondarily involving the nervous tissue itself. Gumma of the skull or of the spinal vertebræ may by pressure or by actual encroachment of the parts underneath the bone lead to serious impairment of function, the symptoms naturally varying according to the site of the gummatous deposit in the bone or of the gummatous infiltration of the parts underneath. The syphilitic neoplasm or diffuse syphilitic infiltration of the nervous system and its coverings is a most frequent cause of disorders of the brain and spinal cord. This occurs most frequently in the dura mater or in the subarachnoid space. From the subarachnoid space the process is apt to invade the pia, and in this way has easy access to the cortical tissue or to the cranial nerves; for it should be remembered that, like the tubercular process, the syphilitic infiltration is very apt to occur at the base of the brain, and more particularly in the interpeduncular space. There can be little doubt but that the specific neoplasm or specific infiltration starts frequently from the connective tissue; in rare instances it starts from the bloodvessels themselves. The diffuse specific infiltration is often associated with well-circumscribed tumor formation, as I had occasion to find in a case reported by me some time ago, in which there was diffuse specific cerebro-spinal meningitis with a special gummatous deposit in the pons.* This specific infiltration is at times of a reddish, at times of a grayish hue, as a rule of a more or less gelatinous character, though sometimes it assumes the consistency of connective tissue. The true character of this infiltration is at times obscured by all sorts of retrogressive changes, possibly the result of treatment, but more often due to a practical self-limitation of the disease, inasmuch as the rapidly proliferating granulation tissue supplied by diseased blood-vessels is apt to be checked in its growth by the obliteration of these blood-vessels in consequence of an arteritis obliterans. The study of these specific morbid processes will lead every one to an appreciation of the very important part played by the blood-vessels. Rumpf is so thoroughly convinced of this, that he is inclined to place the general specific infiltration and the specific endarteritis in one box, and claims that in the one case the disease starts from the blood-vessels of the connective tissue, while in the case of arterial disease the process starts from the vasa nutrientia of the blood-vessels themselves. But we must pay a little more attention to the specific disease of the blood-vessels.

While Virchow, as long ago as 1847, recorded the observation of the caseous infiltration of the dura mater at the base of the brain, leading to compression of the carotid, with thickening of its walls and subsequent thrombosis, the credit of having discovered the genuine specific disease of the arteries themselves is due to Steenberg and Heubner. Heubner maintained that the syphilitic process took its start between the elastic lamella of the intima and the endothelium; that it consisted of a proliferation of endothelial cells which gradually formed into connective tissue consisting of spindle and star-shaped cells. Into this connective tissue an emigration of round cells took place which led to the formation of granulation tissue, very much like the tissue of syphiloma found elsewhere in the body. Heubner also insisted that this process led naturally to a gradual occlusion of the artery, but that it also spread lengthwise along the blood-vessels, and thus soon involved a very extensive area of a given blood-vessel within its clutches. The occlusion of the arteries leads to a cessation in the proliferation of this granulation tissue, and ultimately to the formation of a cicatrix, thus necessarily bringing about an entire loss of function of the tissues supplied by the affected blood-vessel.

Köster, in opposing Heubner, maintained that the intima did not play the important part which Heubner claimed for it, but that the vasa vasorum were the actual starting point of disease. He endeavored to prove that only such arteries as contained these smaller blood-vessels were ever the seat of disease. Friedländer maintained that what Heubner described as a specific endarteritis was nothing but a typical arteritis obliterans; and Heubner himself, in a later article (Virchow's Arch., vol. lxxxvi), acknowledges the correctness of Friedländer's criticism, at the same time denying that the muscular or the adventitious coat is necessarily the starting point of the specific disease. Heubner says: "No proliferation, no tumor caused by syphilis, is in any way specific; the etiological factor stamps it as a specific process" (Ziemssen's Cyclop., Germ. ed., p. 300, foot-note.)

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* See plate at end of this article.

The status of our pathological knowledge regarding all the specific morbid processes underlying nerve syphilis is well summarized by Rumpf in his monograph. The following are his main conclusions: First, syphilitic disease of the nervous system emanates invariably from the blood-vessels. We have to distinguish between a syphilitic infiltration of the capillaries of the connective tissue and the syphilitic infiltration of the capillaries of the blood-vessels. Both processes may lead in rare cases to the formation of circumscribed tumors which in a certain stage of retrogressive metamorphosis may be termed gummata; but these processes more frequently lead to widespread infiltrations. The retrogressive metamorphosis is due largely to the insufficient blood supply brought about by disease of the blood-vessels. Syphilitic infiltration of the capillaries of the blood-vessels may give rise to loss of function by occlusion of the blood-vessels, or by laceration of the blood-vessels leading to hæmorrhage. The softening and hæmorrhages which occur in specific cases are secondary phenomena.

All these careful researches have, after all, led to the rather disheartening conclusion that there is nothing absolutely characteristic of specific disease. The very same changes which we find in undoubted syphilitic cases are equally characteristic of leprosy, and even of tubercular deposits, with the exception that tubercular deposits tend rather to caseation, while syphilitic products are apt to undergo retrogressive metamorphosis. It was hoped that the bacteriological researches begun by Klebs (Arch. f. exp. Pathol. u. Pharm., 1879), Disse and Taguchi (Deutsch. med. Wochenschr., 1885), Doutrelepont (Wiener med. Wochenschr., 1884), and Lustgarten (Verhandl. des Congr. f. innere Med., 1885) would lead to the discovery of the bacillus of syphilis, the presence of which would prove the syphilitic character of any morbid process, as the presence of Koch's bacillus proves the tuberculous character of a given lesion. But these investigators have failed of their purpose, and to-day we are not much nearer to the solution of this problem than we were ten years ago.

In a paper published in 1891 I remarked that "whether or not the vast differences in the ultimate fate of tubercular or syphilitic products, in spite of their histological resemblances, is due to the differences in the life history of the bacilli of tuberculosis and of syphilis, is a question for the bacteriologists to decide"; but we must wait patiently until this decision is reached. In the meantime we have to push still more vigorously than before the purely clinical studies in reference to syphilis of the nervous system. This part of the subject can be pursued satisfactorily if we make the necessary subdivisions and study in the order mentioned here: 1. Syphilis of the brain and its coverings. 2. Syphilis of the spinal cord and its coverings. 3. Syphilis of the peripheral nerves.

I. SYPHILIS OF THE BRAIN AND ITS MENINGES.

The symptoms of syphilis of the brain and of its meninges will be best understood if we revert once more to the pathological anatomy of the syphilitic processes affecting the intracranial contents. We have to distinguish between the syphilitic neoplasm which may invade the meninges, or the brain proper; the diffuse meningeal infiltration with special gummatous deposits; and, lastly, specific disease of the arteries of the brain proper. The syphilitic neoplasm, or gumma, occurs most frequently in the cortex of the brain, directly or indirectly involving the meninges; much more rarely in the vicinity of the larger ganglia. Next in frequency to cortical gummata are those which occur in the pons, medulla, or crus. The symptoms of a syphilitic gumma will resemble very closely those produced by any other form of neoplasm, with such few modifications as are characteristic of syphilitic disease in all parts of the nervous system.

The diffuse specific meningitis, or meningeal infiltration, is the prime cause of a very large proportion of cases of brain syphilis. From its topographical development this specific infiltration naturally leads to the same set of symptoms which we find in connection with other cortical and meningeal processes, except that the very diffuseness of the pathological process and the diffuseness of the symptoms are characteristic of syphilis rather than of any other disease, with the possible exception of tubercular affections of the brain and meninges. This diffuse specific infiltration may start from the arachnoid, or pia, soon invades the cortex, leading to an adhesion between the cortex and the pia. Inasmuch as the entire specific process corresponds accurately to a slow form of chronic inflammation, we may well describe this special and frequent form of brain syphilis as a specific leptomeningitis, or meningo-encephalitis. This may occur over any portion of the hemispheres; it may cover almost an entire hemisphere, or even both hemispheres, while in some cases it may be distinctly circumscribed. But inasmuch as the same leptomeningitis may affect the base of the brain as well as the cortex, we find a ready explanation for the frequent occurrence of cranial nerve symptoms, with or without paralysis in some cases, while in other cases we have monoplegia, or hemiplegia, which we know to be due to cortical disease only. The very variability in the extent and in the intensity of development of syphilitic lesions makes the cases of brain syphilis the very best examples one could find for the study of the functions and the pathology of the various parts of the brain.

Syphilitic disease affecting the arteries of the brain, whether it be an endarteritis, a mesarteritis, or a peri-arteritis, ultimately leads to the occlusion of the blood-vessel by thrombosis, and thus interferes with the function of the parts supplied by the diseased vessel. In other instances the walls of the diseased blood-vessels may cause the formation of small aneurisms, and may lead to hæmorrhage, just as the well-known miliary aneurisms that occur in advanced life are the cause of the majority of the cases of apoplexy after the age of forty-five. Occasionally, too, a particle dislodged from a thrombus formed in a blood-vessel whose walls have undergone specific changes may give rise to embolism in other parts of the brain. It is important to remember, however, as a practical rule, that thrombosis is by far the most frequent cause of apoplexy in syphilitic subjects, and that, therefore, in any case in which the onset of the apoplexy suggests thrombosis, the probability of syphilitic disease is very great, and if the symptoms in other cases point to the probability of hæmorrhage as the cause of apoplexy, it should not be forgotten that this, too, occurs as a result of syphilitic arterial changes.

It is not only of importance to recognize the probability of syphilis from the occurrence of thrombosis, or hæmorrhage, in comparatively young subjects, but also to note that while arterial disease, due to syphilis, affects the ganglionic region most frequently, and next in frequency the base of the brain, it rarely is the cause of syphilitic disease in the cortex or in the meninges. Syphilitic disease of the cortex and its coverings is, with the rarest exceptions, due to the specific infiltration, or possibly to the deposit of one or more syphilitic tumors.

Symptomatology.—A few general symptoms may be mentioned at the outset which are common to all syphilitic diseases of the brain. First and foremost, persistent headache in persons who have not inherited such tendencies, and who have not been exposed to any traumatic injury, is very suspicious of syphilitic brain disease. This headache is generally diffuse, though in a few cases it may be most marked along the distribution of one or the other of the trigeminal branches. This headache is the expression of the inflammatory process in the meninges, and inasmuch as it frequently precedes apoplectic attacks which are caused by disease of the blood-vessels in the interior of the brain, it is fair to suppose that the meninges are more or less affected even in such cases; while the headaches in cases of specific leptomeningitis, or of specific encephalitis, are the natural result of the peculiarity of distribution of specific disease.

Another symptom characteristic of all syphilitic brain diseases, and for that matter even of spinal syphilis, is the extreme variability of the symptoms. No other morbid process is as apt as syphilis is to cause most alarming symptoms—say coma, convulsions, paralysis—on one day, all of which may disappear (at times within a few hours), and often enough within a period of a few days. I have also held (in a paper on Syphilis of the Spinal Cord read before the N. Y. Neurological Society, April, 1893, but not yet published) that the disproportionate relation between the extent of area affected by syphilitic disease and the slight intensity of the disease in any given area is characteristic of the specific process. I have seen cases of syphilitic brain disease implying by their symptoms involvement of an entire motor area of the occipital portion of the cortex, and even of the base, and yet proving by the paresis and not paralysis of the parts affected, by the very transitory visual defects, by the rapidly receding ocular palsies, that the morbid process, although extending over a very large portion of the brain, did not seem to be developed to any marked degree in any one portion. Other morbid processes, like multiple hæmorrhages, or multiple malignant tumors, or tubercular deposits here and there in the brain, would give rise to such grave general symptoms as are not apt to occur in cases of syphilis.

Still another characteristic of syphilitic disease of the entire central nervous system is found in the fact that in cases with brain symptoms we get the history of a previous affection which must necessarily have been due to disease of the spinal cord; and *vice versa*, in the cases of typical spinal syphilis we find evidence of former syphilitic brain disease. Bearing these general symptoms in mind, we can proceed to the consideration of the special symptoms due to the localization of the specific process in the different parts of the brain.

Disease of the Cortex and the Meninges.—These cases will surely be characterized by persistent headaches; but while similar headaches may occur together with a different localization of disease, they may, if definitely circumscribed, lead to the conclusion that patches of specific meningitis exist under those areas of the skull which are painful to touch or in which the patient localizes the headaches. These headaches are apt to be associated with stupor or coma, the degree of each depending upon the intensity of the process. It is in keeping with our understanding of the pathological character of the specific meningo-encephalitis that these symptoms, namely, stupor and coma, are rarely developed suddenly, but as a rule come on in insinuating fashion and are gradually increased. Both stupor and coma may be absent in cases in which the headaches are associated with another symptom of the very greatest import: I refer to localized convulsive seizures, localized epilepsy, or Jacksonian epilepsy. These convulsive seizures, ever since the investigations of Jackson, are known to be the result of irritation of the cortical centers; and inasmuch as the motor areas which show a remarkable predisposition to every form of intracranial disease are also frequently the seat of specific disease, it is natural enough that convulsive seizures of an arm, of a leg, of the face muscles, when associated with headache, with stupor, or with coma, should point, in the absence of other causes, to specific disease of the cortex. If the general symptoms, headaches, stupor, and coma, are associated with hemianopsia, with motor aphasia, with sensory aphasia, with impairment of taste and smell, or with epileptic seizures, preceded by distinct olfactory, gustatory, or auditory auræ, the inference may be made that the specific process is chiefly developed over the centers governing these functions. Diagrams illustrating the exact position of these various centers can be found in any of the many recent text-books (Gowers, Dana, Gray), and I do not consider it necessary to enter upon the explanation of these details, which, after all, have become common property. If the specific disease is developed over the frontal (silent) parts of the brain, we are apt to have general symptoms only, with possibly nothing but localized frontal headaches pointing to the probable seat of the disease. From a practical point of view specific disease affecting the motor areas is of the very greatest importance, and whether this be due to actual gumma or to patches of specific meningeal disease, the symptoms will be very much the same, with the exception that, in cases of tumor, there may be the accompanying symptoms generally recognized to be the result of neoplasm, namely, optic neuritis, vertigo, nausea, etc. The following are the symptoms of specific disease over the motor areas. Keep in mind again the general symptoms, and you will expect in every case to obtain the history of headaches, diffuse or circumscribed; you may obtain an account implying exceeding variability of this and of other symptoms; you may have stupor or coma, and in addition to these general symptoms you will have the following localizing symptoms: First, epileptiform seizures, with or without loss of consciousness, beginning in any part of the face, the upper or lower extremities, gradually extending to other parts, and possibly leading, before the seizure is over, to general convulsions. Such epileptiform seizures may have existed for some time before paralysis of the parts first convulsed sets in. This paralysis denotes that the irritation of cortical centers has led to a destruction of a part or of the whole of the center. Even after the parts have become completely paralyzed epileptic seizures may occur, as Nothnagel pointed out, in which the paralyzed parts become convulsed. Convulsions may occur, to be sure, in connection with disease in the interior of the brain, in the initial stages, for instance, of an attack of apoplexy, due to disease of one of the branches of the middle cerebral artery leading to a loss of function of the fibers passing through the capsula interna. But what I hold to be extremely characteristic of cortical as opposed to intracerebral disease is the occurrence of *repeated convulsions.* A single convulsion associated with such general symptoms as I have mentioned and with the onset of paralysis is therefore not characteristic of cortical disease; but if we have a paralysis firmly established and repeated convulsions of the parts paralyzed, we may be certain that the disease is in the cortex, and not in the region of the larger ganglia. Inasmuch as the leptomeningitis or the gummatous neoplasm may be developed over circumscribed areas of the cortex, it is natural to expect that monoplegia will be a frequent form of syphilitic disease of the cortex and the meninges. Such cases undoubtedly do occur, but they are of far less frequency than one would suppose, and are more apt to be due to the syphilitic neoplasm than to diffuse syphilitic disease of the cortex or meninges. These cases of monoplegia sometimes terminate, from the mere diffusion of the process, in cases of hemiplegia. The following case from my own experience will illustrate the point, and will show the extension of the disease from the arm center to the leg and face centers. It will also bring out the salient points of syphilitic cortical disease:

Mr. S., aged fifty, a widower, was seen by me in the autumn of 1888. By his family physician I was told that he had contracted syphilis after the death of his wife, having passed through the various stages of constitutional syphilis, preceded by the development of hard chancre. He had received the most careful treatment, first by mercury, and later on by the iodides. About six months previous to the time of my first visit he had begun to complain of intense headaches. Three months previously he had had, during periods of excitement, attacks of transitory motor aphasia. As he was passing through a great deal of excitement in his business, no special cause was suspected as an explanation of these attacks. About a month before my first visit the patient complained of involuntary twitchings in the right half of the face, and the occasion of my seeing him was the first occurrence of a typical convulsive seizure of the right upper extremity beginning in the wrist, attended by a short period of unconsciousness and followed by a weakness of the right hand. A thorough examination of the patient revealed no symptoms referable to any other part of the body except that the right knee-jerk was much increased, but at this period there was no ankle clonus. The subsequent history of the case was simply this: the convulsive seizures increased in frequency; for a time they were strictly localized, after a while they terminated in general convulsions. The paralysis of the hand increased gradually, a weakness of the leg supervened, permanent motor aphasia was established, and within six months of my first visit a gradual development of dementia was noticeable. The man became permanently bedridden, became absolutely demented, remained completely paralyzed on the right side of the body, and finally died in 1890, two years after the onset of the first symptoms. It is needless to say that he was given the benefit of extreme antisyphilitic treatment, which brought about slight remissions at times, but did not suffice to check the downward progress of the disease. The patient's other organs were entirely sound. There was no heart disease, there were no symptoms of kidney trouble, and his arteries were not even atheromatous.

The entire development of the case, following quickly upon the acquisition of syphilis late in life, lends support to the view that this was a typical case of specific meningo-encephalitis, chiefly over the left motor area.

The case just recited constitutes an exception in point of severity to many of the cases of syphilitic disease of the cortex or of the meninges. We meet with cases every now and then in which the suspicion of syphilitic disease of the cortex is strengthened by the preponderance of the localizing symptoms over the general symptoms. Thus we may have a complete hemiplegia with occasional localized convulsions, without stupor, coma, and with only slight headaches. Imagine such a series of symptoms due to hæmorrhage over the cortex, and it will at once be seen that a hæmorrhage which would have been sufficient to bring about a loss of function of the leg, arm, and face centers would surely have produced very marked general symptoms. The initial stages of such a case would have been characterized by the most profound coma, which would have lasted for days, if not for weeks; whereas the circumscribed development of the syphilitic process, both in the cortex and in the meninges, need not cause such marked general disturbances.

Syphilis affecting the Larger Ganglia.—In the interior of the brain gummatous deposits are of such exceeding rarity that we can practically disregard them. If they do occur, they will be followed by all the symptoms due to neoplasm in this region. The manifestations of syphilitic disease of the larger ganglia are due to arterial disease. The specific arteritis to which reference has so frequently been made is prone to attack one or more of the branches of the middle cerebral artery which supplies the region of the internal capsule through which the motor tract supplying the opposite half of the body passes. A small lesion, whether it be a hæmorrhage or softening as the result of the arterial occlusion, may in this part of the brain give rise to widespread symptoms, for the fibers going to the opposite half of the body are closely packed together within an area not much greater than that of a good-sized pea. Syphilitic arterial disease in this region leads to apoplectic attacks closely resembling in most respects ordinary adult apoplexy. Inasmuch as thrombosis is by far the most frequent result of this special form of arterial disease, a slow onset of the apoplectic attack so characteristic of a gradual occlusion is frequently noticed. It is not an apoplexy in the good old sense of the word; the patient is not stricken down as by a blow, but he first notices a peculiar numbness, say in the hand, the face, or the leg, or in several of these parts at one and the same time. This numbness gives way to a weakness, and after the lapse of a few hours, or possibly even a longer period of time, the hand that was weak becomes paralyzed, to be followed by the same change of symptoms in the case of the face or the leg. There is, as a rule, no loss of consciousness, and the initial convulsions which are the rule in cases of hæmorrhage, and also in cases of embolism, are absent in the majority of these syphilitic apoplexies. If syphilitic disease of the arteries leads to hæmorrhage, the only difference between these cases and those due to thrombosis is in the more rapid onset of the paralysis, and in the greater likelihood of the occurrence of coma and convulsions at the onset. But let me state once more that in apoplexies due to lesions in this region the convulsions are not likely to be repeated.

Paralysis due to thrombosis of syphilitic arteries may be as lasting as those due to other diseased conditions of the arteries, but in some instances recovery is remarkably rapid. Whether such a thrombus is more apt to become canalized, or whether the collateral circulation does its duty more fully, possibly because it has been prepared for the emergency for a longer period of time prior to the actual accident, it is difficult to state. These cases are characterized, furthermore, by all the symptoms so well known in connection with cases of adult cerebral palsies. The leg is most apt first to recover, the face next, the arm last of all. The reflexes are increased in the paralyzed extremities. This is true of the wrist reflexes, the elbow reflex, the knee-jerks, and the ankle clonus. The faradic response remains normal throughout the entire period of paralysis. No appreciable amount of atrophy takes place, but contractures are very apt to set in. Here, again, a case seen in private practice may illustrate the chief points:

Mr. J., a lawyer, thirty-two years of age, has been guilty of excesses, sexual and alcoholic. Acquired syphilis five years ago; received active treatment and was in good health until the summer of 1892, when he became irritable, developed difficulties of speech, particularly if he attempted to address a jury, began to forget names, and complained of serious headaches which troubled him both day and night. In August, 1892, had had a first apoplectic attack, in which he lost speech completely and was paralyzed in the right half of the body. When I examined him in September, 1892, his speech was still a little deficient, but he had entirely recovered from the attack of hemiplegia. During the subsequent months he had a few attacks of transitory weakness of the right leg, so that he appeared to be in danger of falling while on the street, and for fear of these attacks he never walked out unaccompanied. In January, 1893, I was called to his house, and found him afflicted with typical motor aphasia. He was not able to utter a word, but could make himself understood by signs, and evidently understood every word that was said to him, answering all my questions correctly as far as he could by sign language. His right arm was weak. While sitting at his bedside I noticed that he endeavored to move the right leg, and at first succeeded in doing so a little; but presently the strength in the arm seemed to diminish and the leg became absolutely paralyzed. For a week arm and leg remained completely paralyzed. Speech was entirely absent, but there was never, from the very beginning of this trouble, even a momentary loss of consciousness. Convulsions also were entirely absent.

At the end of a week he began to utter a few words, the leg began to recover, the arm also quickly recovered, and now, after the lapse of a little less than three months, he is entirely well. There is not a single trace of the old hemiplegia, barring a lively knee-jerk on the right side, and his speech shows only a very slight tremor. The headaches have entirely ceased, and he is now ready to return to his work—thanks, as I think, to the enormous doses of iodide and mercury that he had received, and to the general tonic treatment that he was subjected to. Were it not for the fear that other attacks may at any time occur, he could be pronounced entirely cured.

Lesions of the Crus.—Syphilitic lesions caudad of the internal capsule are apt to be due either to arterial disease or to disease of the basilar meninges. The general symptoms of syphilitic disease will be the same as those noted in the case of disease of the cortex and of the internal ganglia, except that syphilitic disease at the base of the brain is distinguished from disease in or over the cortex by the absence of repeated convulsions and by the lesser likelihood of development of stupor and coma. The localizing symptoms, on the other hand, are of a very definite character, inasmuch as the hemiplegic form of paralysis is associated with paralysis of various cranial nerves. Thus in cases of crus lesions we have paralysis of some or all of the muscles supplied by the third nerve of one side, with hemiplegia of the opposite side of the body. The clinical picture consists, as a rule, of a ptosis of one eye, complete paralysis of all but the rectus externus muscle, associated with an alternate hemiplegia.

Lesions in the Pons.—These are characterized by an alternate form of paralysis implying paralysis of the facial nerve in all its branches, together with paralysis of the arm and leg of the opposite side of the body. In these cases the trigeminal nerve may be involved, the auditory as well, possibly the sixth nerve. Thus we may have all the complicated symptoms which are so characteristic of pons lesions, due to whatever cause.

Lesions of the medulla are not infrequent in syphilitic patients. The cranial nerves whose nuclei are situated in the medulla, the hypoglossal, the glossopharyngeus, the accessorius, the vagus, any or all of these nerves may be involved, and associated with these there may be a paralysis of the upper and lower extremities of the opposite side of the body. The pyramidal tracts containing the motor fibers are in this region so close to the median line that a small patch of meningeal infiltration may involve both of them, and thus we may have a paralysis of all four extremities, together with paralysis of the nuclei of the nerves emanating from this part of the brain. A most interesting case of this character I had occasion to describe a few years ago in my paper on Multiple Cerebro-spinal Syphilis. The case, which was unique in many respects, deserves to be recorded here.

W. K., a saloon-keeper, single, a heavy-set man of forty odd years, came to the Polyclinic in the autumn of 1888. He confessed to syphilitic infection, with secondary skin and throat symptoms, a few years previously. About a year before his first visit he had noticed a heaviness in the tongue and a numbness of the left hand; soon the left hand grew weaker, speech became more and more difficult, deglutition was interfered with, and by degrees the left leg grew weaker. It was only by the greatest effort that he was able to drag his heavy body to the clinic. On examination, his symptoms were a very marked atrophy of left half of tongue, and, to a slighter degree, of right half; fibrillary twitchings about equal in both halves; complete reaction of degeneration, with altered galvanic response in left half of tongue; in right half faradic response was extremely weak, but galvanic response was not altered. There was no symptom indicating involvement of any other cranial nerve, as determined by careful testing. Jaw clonus was present; we also noted the exaggeration of both wrist reflexes, triceps reflexes, and both knee-jerks, reaction of degeneration, and also double ankle clonus. No sensory impairment. At this time the greater involvement of the hypoglossal nerve on the same side as the greater hemiparesis was a little puzzling. The diagnosis was made of syphilitic disease in the region of the medulla, and the patient was placed on large doses of the iodides. The symptoms soon grew worse, the right arm and right leg becoming as paretic as those of the left side. The patient's helpless condition necessitated his being put into the Polyclinic Hospital. Here the mercurial and iodide treatment was pushed to the extreme, the patient receiving fully four hundred and fifty grains of the iodides and a drachm of mercurial ointment *per diem*. After two weeks the symptoms began to recede; the right arm and leg improved to such an extent that the patient appeared to have a left hemiplegia with bulbar symptoms; but in the course of another year the hemiplegia was practically reduced to a paretic condition of the left arm, and even the bulbar symptoms disappeared in an astonishing fashion. One day, intending to demonstrate the reaction of degeneration before the students on the tongue of this patient, I was surprised to find the faradic response present, and at later examinations there was nothing but a slight sluggishness of galvanic contractility to remind me of the former reaction of degeneration; the atrophy was also less marked. The patient remained in about this same condition; slight relapses would occur every now and then, which were counteracted or checked by an increase in the administration of the iodides. He was doing extremely well, for months visited the clinics regularly, by request exhibited himself at other institutions, and nothing but the paretic condition of the left arm and a limp with the left leg reminded one of his old and serious trouble. In March of this year he was seized with pneumonia, which ended fatally after a few days.

Basilar specific processes lead so frequently to an involvement of the cranial nerves without involvement of the pyramidal tracts underneath that we must devote a special section to the consideration of these forms of disease; and as the affection of the oculomotor nerves is of practically the greatest importance and is typical of the other specific cranial nerve affections, let us examine more particularly into the character of

OCULOMOTOR PALSIES.

In not a few instances these ocular palsies are the first and sometimes the only symptoms of nerve syphilis. The third and the sixth nerves are those most frequently affected. The fourth nerve may be diseased, but since it is rarely affected without the simultaneous involvement of the third nerve, the resulting paralysis of the superior oblique muscle is of very little practical importance. If the third nerve is the one chiefly affected, we are bound to have either ptosis or a more or less complete paralysis of all the oculomotor muscles except the superior oblique and the rectus externus, the former being innervated by the fourth nerve, the latter by the sixth. In addition to the paralysis of the external muscles of the eye there is also a paralysis of the internal muscles, causing a loss of light-reflex and a failure of pupillary contraction during accommodation. Whenever we find some but not all of the muscles supplied by a cranial nerve paralyzed, we are justified in drawing the conclusion that the seat of the trouble is in the nuclei of the nerve, and not in the nerve tract after it issues from the brain. The nucleus of the third nerve stretches along the floor of the third ventricle, and is of such considerable extent that the various subdivisions can be distinctly recognized, and one or more of these subdivisions in which the function of individual or of closely related muscles is represented may be diseased, while other groups may entirely escape. This nuclear ophthalmoplegia, as it is called, is sometimes due to specific disease, as cases quoted by Rumpf amply prove; but it is wrong to suppose, as I pointed out in a former article (Am. J. of Med. Sc., Sept., 1889), that partial ocular palsies in syphilitic subjects are always the result of nuclear disease. Some years ago Thomsen (Arch. f. Psych., vol. xviii) reported an interesting case in which a nuclear paralysis was simulated by a gummatous infiltration of the root fibers of the third nerve, and in the paper above referred to I came to the conclusion that "paralysis of one or more muscles, and not of all muscles supplied by the oculomotor nerves, does not necessarily imply a nuclear lesion, . . . for in syphilitic cases an affection of the nerve rootlets may give rise to symptoms exactly like those of nuclear disease."

Next in frequency to palsies of the third nerve are those of the sixth. As the result of disease of this nerve the rectus externus is paralyzed. Double vision is the most common symptom complained of by patients suffering from any form of specific ocular palsy.

A special value attaches to these ocular palsies from the fact that not a few cases of tabes begin with paralysis of one or the other muscles of the eye; and since syphilis plays such an important *rôle* in the etiology of tabes, there is always a strong suspicion that an ocular palsy may not be merely a transitory and isolated affection, but that it may represent the beginning of grave spinal-cord disease. At all events, it will be well in every case of ocular palsy to examine the knee-jerks, to inquire into the subjective symptoms of the patient, to examine for the Romberg symptom (that is, whether the patient can stand without swaying with eyes closed), in order to exclude the possibility of tabes. These syphilitic ocular palsies are thoroughly amenable to treatment, though in some instances the paralysis is permanently established, and tenotomies of opposing muscles yield the only possible relief. Of the many cases of such palsies that I have seen I will cite but two: the one, showing the vast improvement made under specific treatment; the other, the utter uselessness of all therapeutic efforts.

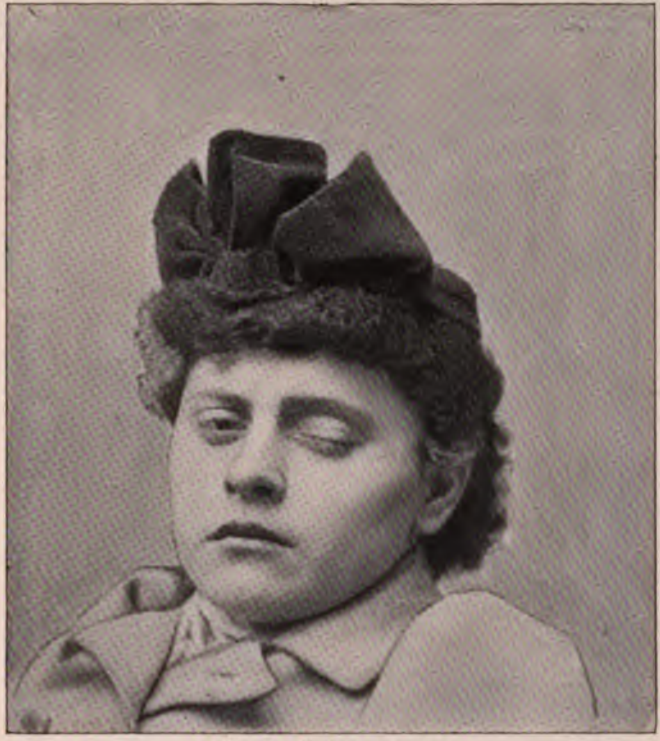

FIG. 1.—Patient at rest.

The first case is that of a young girl who was sent to me from Connecticut in the early autumn of 1892. The history she gave was to the effect that on the 4th of July, 1892, she suddenly found that she was not able to raise the left eyelid, and when lifting it with her finger noticed that the eye stood in the extreme outward position. No other symptoms were recorded except a slight dizziness and headaches, which had preceded the onset of the ocular palsy and continued for several days thereafter. She was under treatment by her home physician, but had not improved at all at the time when she first consulted me, about three months after the onset of the trouble.

At the first examination I noted complete ptosis and complete paralysis of all external muscles excepting the rectus externus, and also paralysis of the sphincter iridis. There was no involvement of any other part of the body, no hemiplegia, and no paralysis of any cranial nerve. I came to the conclusion at once that this must necessarily be a specific palsy, although I could not, within the limits of a first examination, get any facts pointing to syphilitic infection; nor have I been able positively to prove this, although there is a strong suspicion of syphilis in the mother of the patient. I placed her upon large doses of the iodides, prescribed mercurial inunctions, and was gratified to find an improvement within two weeks of the first inunction. This improvement has been steadily in-

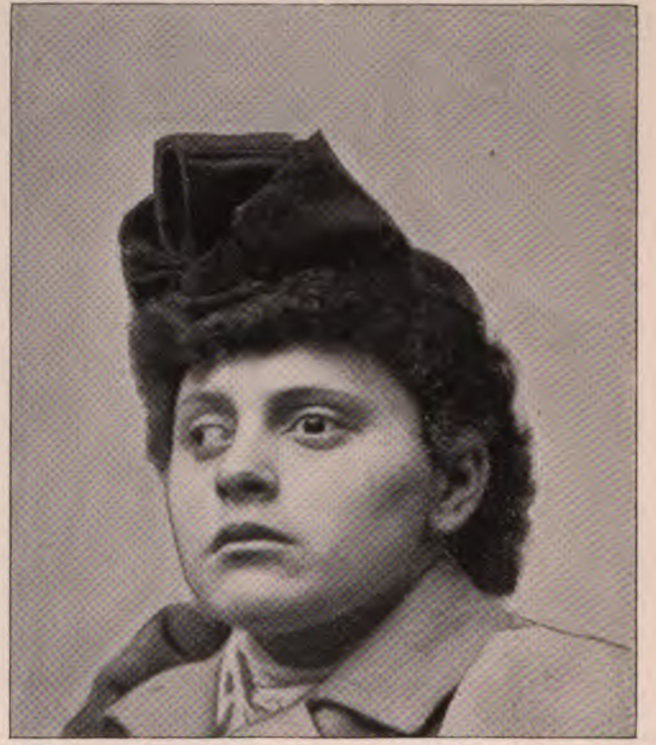

FIG. 2.—Position of eyes when patient attempts to look to the extreme right.

creasing, until now she is able to raise the eyelids at will, and can move the eye inward, so that the pupil passes the median axis of the palpebral fissure. The accompanying photographs will show the appearance of the eye when at rest, and of the position of the eye upon extreme volitional effort. There is no doubt in my mind but that the ocular palsy will be still further diminished, and that it may possibly disappear altogether. If the therapeutic test is ever to aid us in diagnosis, it may do so in a case like this, in which the improvement set in very promptly after the proper administration of specific treatment.

The second case is that of a young man, aged thirty, who had acquired syphilis about five years previously. There had been some few constitutional symptoms; he had suffered much from headaches and from dizziness. In the autumn of 1889 he first consulted me on account of double vision, having been referred to me by Dr. Gruening. There was paralysis of the rectus externus muscle and slight limitation of the upward and downward movement of the eye. Under prompt antisyphilitic treatment the condition seemed to be slightly improved; but the improvement was soon lost, and in spite of all further treatment no real progress was made. The process had evidently become stationary, and retrogression did not seem possible. After much temporizing the oculist determined to cut the muscles of the eye, and since that time the position of the eye has been corrected and the patient considers himself cured. The possibility of a relapse must, of course, be borne in mind.

2. SYPHILIS OF THE SPINAL CORD AND ITS COVERINGS.

Until a few years ago syphilis of the spinal cord was supposed to be a comparatively rare affection, but the researches of Rumpf, of Oppenheim, of Siemerling, and possibly my own of a few years ago, but, above all, the recent investigations of Erb, have proved that cases of spinal syphilis are almost as numerous as those of syphilis of the brain. Many of the cases which we now recognize to be cases of syphilitic disease of the spinal cord were diagnosticated formerly as cases of chronic myelitis, of primary lateral sclerosis, and as cases of secondary degeneration following an acute myelitis.

Pathological Anatomy.—The pathological anatomy of spinal syphilis is unquestionably very similar to that of cerebral syphilis. The disease may in rare instances start from involvement of the bone, as in an interesting case reported not long ago by Leyden (Berl. kl. Woch., 1889); but it is much more frequently due to the diffuse infiltration of the meninges, which leads to adhesions between the pia and the substance of the cord, and which may invade at times the substance of the cord, giving rise to varying degrees of specific myelitis. If we examine the spinal cord in cases of lues spinalis we can detect easily the characteristic changes of syphilis in the blood-vessels of the pia and in those of the spinal cord.* But arterial disease does not, so far as we at present know, play the important *rôle* that it does in cerebral syphilis. If spinal syphilis is ever due to softening as a result of thrombosis of spinal arteries, or to destruction of spinal tissue by the oozing of blood from syphilitic arteries, the post-mortem evidence of such conditions has yet to be furnished.† We are safe, therefore, in asserting that spinal syphilis is largely the result of specific infiltration of the spinal meninges, or possibly of a specific meningo-myelitis. The specific process may attack any part of the cord. It may be strictly localized either in the cervical, in the dorsal, or in the lumbar regions, and it may involve all of these parts at one and the same time. It is sometimes most pronounced over the dorsal surface of the cord; in other cases, again, it is chiefly developed along the ventral surface. For some reasons, which we can not satisfactorily explain at the present time, the invasion into the cord takes place most frequently along the lateral columns. In some cases the posterior columns become affected, and in still other though by far smaller number of cases, the disease attacks the anterior horns. According to the chosen area of invasion, the symptoms will vary; hence, spastic paraplegia is a very frequent condition in spinal syphilis. In some few cases the sensory symptoms due to lesion of the posterior columns of the spinal cord, will be present, and these cases may closely simulate tabes dorsalis. In others, again, the flaccid form of atrophy associated with paralysis and with the reactions of degeneration, will point to an involvement of the anterior horns.

Symptomatology.—Spinal syphilis, like cerebral syphilis, aside from the localizing symptoms, which have a simple topographical value, is characterized by the variability of symptoms, by remissions, and, as I have shown in a paper on spinal syphilis not yet published, by the disproportionate relation between the widespread area of the disease and the very slight intensity of the process at any given area. It seems to me that by these general symptoms we shall be able to recognize the syphilitic character of spinal paralysis very much more readily than by other symptoms which simply indicate the anatomical extension of disease. A few typical cases of spinal syphilis, which I shall now recite, will enable us to study the symptoms very much better than we can by means of wordy descriptions:

CASE I.—Mr. C., aged fifty, referred to me by Dr. Gibney in September, 1891, and has been under treatment ever since. There was a distinct history of syphilis nearly thirty years ago, followed by constitutional symptoms. Patient has been married twenty-three years; wife has had no children; has been an active brain-worker for many years, but moderate in his mode of life. In November, 1890, he had an attack of illness, during which his right eyelid drooped and his left leg was paralyzed. In the course of a few weeks he recovered sufficiently to get about again. He also had eczema ani shortly after this, and was treated by various physicians for the tertiary symptoms of syphilis. In the early part of 1891 he had a severe attack of influenza. A few months later, in May, 1891, he developed paresis of the right leg and a paresis of bladder and rectum. He recovered in two months and was once more active in business. Two weeks before I first saw him he was compelled to go to bed again, his legs having grown weak, and his bladder and bowels not acting voluntarily. The condition I found him in was a rather critical one. In addition to the complete spastic paralysis of both lower extremities there was also complete paralysis of both arms and hands. There was no increase of the wrist-elbow reflexes, but a decided tendency to atrophy of the interossei, particularly in the left hand. The knee-jerks were enormously exaggerated. There were extreme contractures of the adductors and flexors of the legs, the extreme condition of contracture of the posterior leg muscles inhibiting the ankle clonus. The pupils were normal, speech was normal, sensation in both lower and upper extremities was normal at the first examination. Electrical reactions of all nerves and muscles was entirely satisfactory. There was retention of urine and inability to evacuate the bowels. This group of symptoms has been materially modified from time to time. The involvement of the upper and lower extremities, with symptoms pointing to a very irregular invasion of the various systems of the spinal cord, left no doubt in my mind as to the nature of the trouble, and in spite of many discouraging circumstances I adhered to, and pushed, the mercurial and iodide treatment to the extreme. At first the symptoms increased in severity, the paralysis became absolute, and anæsthesias were soon associated with the paralysis. The anæsthesia was evident only in both feet and legs up to the middle of the leg, and over the sacrum and lower dorsal spine. There was no anæsthesia in the upper extremities, but very decided paræsthesia of all sorts.

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* See plate accompanying this article.

† Since writing above some researches bearing upon this point have been reported in the Medical Week for April, 1893.

Within two months of the beginning of treatment, while the condition of the lower extremities remained unchanged, the upper extremities recovered completely and have been entirely normal ever since. Scarcely had these symptoms been recovered from when the intensity of the process in the lower cord seemed to increase. A bedsore began to form, which, in spite of the most careful nursing, increased in size until it was large enough to put one's fist in. For fully eight months it was a threatening feature of the case, but finally healed completely under the surgical skill of Dr. Gerster. There has been gradual improvement in the paralysis, so that now, after much patient treatment, he is able to walk about with the assistance of his crutch and an attendant, with every prospect of regaining the normal use of his legs unless a sudden relapse should set in. All the anæsthesias have completely disappeared, the contractures are relaxed, the ankle clonus is now apparent, but spasmodic twitchings of the legs still occur frequently enough, while the bowels and bladder do not to this day act voluntarily. several attacks of cystitis and rectal disease have been added to the difficulties of the case, but at this writing the patient is doing well.

Case II resembled the first in many particulars, and still has run a very different course :

Mrs. C., a lady, fifty-three years of age, having five children, all healthy and married, was first seen in June, 1891. She was in good health until two years previously, and extremely active in spite of her weight—nearly two hundred and fifty pounds. After the blizzard she had a troublesome cough, and for a long time did not feel well. In the spring of 1889 began to notice a heaviness in the left leg, which would remit at times, and then would grow worse again, so that she was accused of having an hysterical affection. The trouble was restricted to the left leg for nearly two years before the right leg became similarly affected. A few weeks before I saw her she was sent to Atlantic City, as the change of air might have a favorable influence upon her supposed functional paralysis. The first examination revealed a very different order of things: First, extreme and absolute spastic paraplegia; not a muscle of a toe or of the legs could be moved. Second, extreme contractures, so that the knees would be firmly clasped together, unless forcibly separated by a pillow. Third, violent spasmodic twitchings, which gave rise to excessive pain. Fourth, there was complete anæsthesia of both legs and as high up as a line passing two inches above the symphysis. Fifth, loss of faradic response without alteration of galvanic formula in all leg muscles and nerves. Sixth, no tendency to bedsores. Seventh, absolutely no trouble with bladder or rectum. The upper extremities were not affected. No history of traumatism or of unusual exposure, and, furthermore, no history of acute infectious disease.

In the absence of these predisposing conditions, and more particularly on account of the extreme spastic symptoms associated with disturbances of sensation and with changes in the electrical reactions (atrophy could not be made out on account of adipose tissue), without, however, any interference with vesical and rectal reflexes and no tendency to formation of bedsores, I made the diagnosis of a specific myelitis. No other pathological process is as selective as specific disease, for the symptoms pointed to involvement of the lateral columns, of the posterior roots or gray matter, and also to the anterior columns or roots on both sides, and yet the column of Clark and the more central gray matter were not affected. I inaugurated and have persisted in specific treatment up to the present day, with gratifying results, although the proof of any specific illness was a long time forthcoming. Some nine months after the beginning of treatment the lady's husband consulted me for very persistent headaches. Suspecting the nature of the trouble, I discovered not only that he had acquired specific disease many years ago, but that he had been under a distinguished surgeon's care for bone syphilis only a year ago. The further progress of the wife's case has been marked by a gradual restoration of the electrical reactions, by total disappearance of the anæsthesias, by the cessation of all contractures and of the spasmodic twitchings, as well as by the slow and steady diminution of the spastic paralysis. She has regained moderate use of all the muscles of the lower extremities, but is still confined to her chair, as her legs will not yet bear her tremendous weight; but I expect her in a few months more to learn to walk, since single efforts at standing have been successful. I may here quote what I have said on another occasion, that I have not seen any but specific cases of spinal-cord disease running such a chronic course and yet showing a tendency to improve after the lapse of one or two years and even longer. I hold that in this case, next to the very remarkable improvement, the unequal development of bladder and trophic symptoms as compared with the intensity of the other symptoms is the most characteristic diagnostic feature.

Case III, which I shall now refer to, shows how the symptoms may vary according to the anatomical distribution of disease :

I saw a young man, aged twenty-six, in consultation with Dr. Lustgarten, of this city, October 14, 1892. The patient comes of very markedly neurotic stock, with a history of insanity in his family, having also one sister who is deaf and dumb. Four years ago he had acquired undoubted syphilis; since last spring has experienced difficulty in walking and in the use of his hands. There was also the history and evidence of paralysis of the right superior oblique. The pupils failed to react to light and during accommodation. At the first examination the young man was quite unable to lift himself up in bed. There was distinct atrophic paralysis of trapezii, infra- and supra-spinati, deltoid, and pectorals; also a paresis of the entire arms and hands, grasp being almost *nil*. All forms of sensation, particularly tactile and temperature sense, were very deficient, while pain and muscular sense were normal. This was true of the upper and lower extremities, extending upward as far as the lower margin of the ribs. The wrist and elbow reflexes could not be elicited. The lower extremities were much emaciated, more so on the right side than on the left. Great weakness was apparent, the patient being scarcely able to lift the leg an inch from the bed, and yet if put on his legs he could stand a little. There was no ataxia. The right knee-jerk was lost, the left knee-jerk very feeble. All superficial reflexes lost. There was no disturbance of vesical and rectal reflexes, no bedsores, but a severe burn over an anæsthetic area of the right leg. The diagnosis of widespread syphilis was clear to me, although the paralysis tended to the atrophic rather than to the spastic type. The good results of treatment were very evident. At my next examination—about two months later, December 6th—I found the patient able to sit up in bed and to walk about freely. The pupils now reacted to light, though sluggishly, and the muscles about the shoulder joints had recovered strength from the atrophic condition. Normal sensation had returned, leaving but a relatively small area of anæsthesia on the trunk; and it is worth noting that at a still later examination the area of anæsthesia had again increased, while all other symptoms had receded. The grasp of hands was nearly normal, and all muscles with the exception of the extensor groups in both forearms had been restored to their normal volume. Faradic response diminished but present in all muscles, even in the extensors, with the exception of the anterior tibial group of right side. Both knee-jerks can now be elicited by re-enforcement, and the mental condition has been much improved.

Four months after first examination patient was able to call upon me at my office, improved in every respect, walking without assistance, and simply using a walking-stick to get about with. He was still affected with double vision in consequence of paralysis of the right superior oblique.

Barring the slight ocular trouble, this was a spinal case clearly enough, though of the atrophic and not of the spastic order. The involvement of the upper and lower extremities, the unequal development of symptoms, paralysis and anæsthesia, are very marked. Electrical conditions, the nutrition and the reflexes, and trophic disturbances are less distinctly present. There is no involvement of the bladder. I made the diagnosis of spinal syphilis with slight cerebral symptoms.

It will be seen from the preceding cases that spinal syphilis is characterized by a paraplegia which may be spastic or flaccid; that it may at times involve both the upper and the lower extremities; that the symptoms may vary in intensity; that the duration of time before recovery may differ very much in given cases; but that the realization of recovery, or rather the hopes of recovery, distinguish these cases materially from other cases of spinal-cord disease. Within the last year a short report of many cases by Prof. Erb, of Heidelberg, has created great interest in the study of spinal syphilis, since Erb claims to have found a special type of symptoms of disease which is invariably due to syphilis. Let us, therefore, stop for a moment to consider the symptoms of

ERB'S TYPE OF SPINAL SYPHILIS.

This type is to be recognized by the following characteristics: 1. The usual symptoms of spastic paraplegia with its peculiar gait, carriage, and movements. 2. The reflexes are very much exaggerated. 3. Muscular contractures slight as compared with the exaggeration of the reflexes. 4. Involvement of the bladder. 5. A slight but yet distinct disturbance of sensation. 6. Gradual onset of the disease. 7. A decided tendency to improvement. The following case from my own practice will illustrate this special form of spinal syphilis:

Dr. X., now practicing in Hot Springs, Ark., consulted me in the autumn of 1892. He is thirty-six years of age, married, has no children. He was formerly in good health. The first symptoms of fatigue came on after slight exertion in 1880. He began to look pale and was run down. He was living in Ottawa, Canada, for a time, and went to sea for a couple of years, but did not improve, and began to have rheumatic pains about the joints. He suffered some from dizziness, and after his return developed a very marked spastic gait, which has slowly increased up to the present time. A slight irritability of the bladder and loss of sexual power were the only symptoms from which he suffered at various times, but both these conditions are now normal. Headaches are his constant affliction. On further questioning I learned that one year after the onset of spastic symptoms he had some difficulty in speaking, associated with a numbness of the left side of the body. Once he had an attack of aphasia lasting twenty-four hours, and remembers a temporary weakness of the left hand. As a result of my examination I noted inequality of pupils; no other head or ocular symptoms. Grasp excellent in both hands, but very exaggerated wrist and elbow reflexes. Spastic gait with considerable rigidity, so that in walking the knees are pressed quite closely together. No anæsthesia anywhere, no trophic symptoms, no tremors, no scanning speech. I made the diagnosis of spinal syphilis, and then learned from the doctor that years ago he had inoculated himself with syphilis in the middle finger of the left hand. I urged repeated mercurial and iodide treatment, but these drugs have not relieved the spastic symptoms.

In this case we therefore have extreme spastic symptoms with contractures, slight involvement of bladder, no sensory symptoms, and no atrophic symptoms, proving much more the selective character of the specific process, the case resembling in most respects one of secondary degeneration after an acute and transitory traumatic dorsal myelitis.

We must concede that Erb's keen clinical insight has led him to the correct recognition of a frequent form of spinal syphilis; but I wish to caution the general practitioner as well as the neurologist against supposing that this type is the most frequent representative of spinal syphilis, or that the diagnosis of spinal syphilis may be incorrect in case the patient does not exhibit the symptoms which Erb formulates for his special type of disease. Erb's patients probably represent that very large class of cases of spinal syphilis in which the meningeal infiltration first invades the region of the lateral columns and passes but very little if at all beyond these white tracts. But of course it does not in any way include those numerous cases in which there is more or less widespread syphilitic myelitis, or in which the gray matter of the anterior horns, the central gray matter, or the posterior gray and white matter are invaded by the syphilitic process. It seems necessary to insist on this point, because indications are already rife that Erb's type is to be made *the* type of spinal syphilis, to which conclusion Erb himself has contributed by speaking of his type as "syphilitic spinal paralysis." Let us not forget that there are many cases of spinal paralysis which do not conform to Erb's type.

TABES AND SYPHILIS.

The question of the relation between syphilis and tabes dorsalis has given rise to many heated discussions, to much argumentation *pro* and *con*. On the one side we have Westphal, Leyden, and others, claiming that there is no more relation between syphilis and tabes than between syphilis and many other spinal-cord affections. On the other hand, we have Fournier, Erb, and more recently Pierre Marie in his brilliant book on the Diseases of the Spinal Cord (Les Maladies de la Moelle, Paris, 1892), maintaining that syphilis is by far the most powerful factor in the causation of tabes dorsalis. The view expressed by Erb many years ago, that "he who has not had syphilis is scarcely ever apt to have tabes," is borne out by the statistics of Erb and others published within recent years. According to Fournier's first statistics, ninety-one to ninety-eight in every one hundred cases of tabes gave a history of preceding syphilis; in Erb's first statistics the proportion of syphilis was eighty-eight in every one hundred; Rumpf, eighty to eighty-five in one hundred; Althaus, ninety in one hundred; while Seguin, taking his cases from private practice, gave the statistics of only fifty-three in one hundred. It is interesting to put in juxtaposition with these numbers the statistics of Westphal, which amounted to but fourteen in one hundred. In view of the personal experience of every neurologist of the present day, the conclusion is inevitable that Westphal did not care to see the truth in this matter.

In order to drive the nail still more firmly, Erb, in the Berliner klinische Wochenschrift, No. 29, 1891, gave an account of three hundred and sixty-nine cases of tabes which he had observed since 1883; three hundred of these cases were of patients from the better classes of society, while fifty were of the class that go to make up clinical patients; nineteen of the cases were in women. Of the three hundred cases from the better classes proof of syphilitic infection was wanting in eleven per cent of all cases; the eighty-nine per cent of cases with distinct specific infection were further subdivided, and it was shown that symptoms of secondary syphilis were present in 63·3 per cent of all cases, whereas chancre only without secondary symptoms was present in 25·7 per cent. Among the lower classes examined by Erb the percentage of cases in which no evidence of syphilitic infection could be found was very much higher, namely, twenty-four per cent; symptoms of secondary syphilis were present in fifty-two per cent; cases in which the chancre was present without secondary syphilis amounted to twenty-four per cent. The only difference between these two classes of patients is practically in the number of those in which syphilitic infection could be positively established, which is equivalent to saying that the well-to-do classes observe their own condition very much more carefully than do the poorer classes. In view of such statistics as these, one can not possibly escape the conclusion that fully nine tenths of all cases of tabes are due to syphilis, and my own experience leads me to think that this percentage might well be placed even higher. In private practice I do not see one case in fifteen of tabes which does not give the full history of syphilis.

Tabes is relatively rare in women, but in women who have tabes the percentage of antecedent syphilis is even greater than in the case of men. Of all the cases of tabes in women that I have seen I have yet to come across the first one in which there was not distinct history of syphilis. Erb has also studied this question with reference to the profession and occupations of tabic patients, and he finds, as every one would expect, that the percentage is particularly low among the clergy, but the cases that he does report among the clergy have invariably been preceded by syphilis. In order to prove that the proportion of syphilis in tabic patients is far greater than could be accounted for on the supposition of the general prevalence of syphilis, Erb has collected five thousand five hundred patients who were not suspected either of tabes or of the acute manifestations of syphilis, and among these he has found that only 22·5 per cent had had syphilis, so that we can compare this 22·5 per cent with the 89 per cent of syphilis in cases of tabic patients, and we have the irrefutable evidence of the preponderating influence of syphilis in the etiology of tabes.

This mooted question may well be laid at rest for all time. It will be of some interest, however, to inquire in what way syphilis produces tabes, and whether tabes is a true sequel of syphilitic infection, as Strümpell (Neurolog. Centralbl., 1886) has recently insisted, or whether syphilitic disease simply predisposes to the development of sclerosis in the posterior columns of the cord. This question has reached a still more acute stage since Hoffmann and Kuh (Arch. f. Psych., vol. xxii), Hoppe (Berl. kl. Wochenschr., 1893), and others have reported cases in which a specific infiltration limited to the posterior columns of the cord has given rise to symptoms during life which could not be distinguished from typical tabes dorsalis. I have now in my possession the spinal cord of a man (case not yet published) whom I had presented to my classes as a typical case of locomotor ataxia, not a single symptom having been found which would have made one suspicious of any other condition, yet at the autopsy we found, instead of a typical posterior spinal sclerosis, a widespread specific infiltration up and down the cord, with special invasion of the posterior columns.

In a former paper I expressed the belief that those cases of locomotor ataxia which began with ocular palsies might possibly represent cases of spinal syphilis. While I have not yet obtained actual anatomical proof of this, I believe it to be well to keep this possibility in mind, and am certain that as our studies of tabes are continued we shall be able to make out a very definite set of cases, in which, although the clinical symptoms of locomotor ataxia are apparent, the diagnosis of spinal syphilis would be the more plausible one. This possibility should be specially considered in the cases just referred to, as well as in all cases of tabes that develop either in very young persons or very soon after specific infection. I quote from my article on Cerebro-spinal Syphilis: "I have recently seen in private practice three cases in which the symptoms pointed to tabes; in the one case the knee-jerks returned after having been absent for some months, girdle sensations disappeared, and the man is well and has had no return of the symptoms for five years. In the second case all the symptoms of tabes were present, except that the knee-jerks were unequal for a time, then became equal, but have remained weak. In a third case, in which the clinical diagnosis of tabes was fully warranted, the one knee-jerk returned and the ocular paralysis (ptosis and abducens paralysis) disappeared as soon as the iodide treatment had been pushed to an extreme. A relapse of the symptoms was relieved in the same way."

In all these cases syphilitic infection had been established beyond the shadow of a doubt, and I repeat my conviction that these and similar cases are probably cases of spinal syphilis rather than of typical posterior sclerosis.

Another point of interest in connection with this matter is the length of time that had elapsed between the syphilitic infection and the beginning of tabes (Erb's statistics):

12·3	per cent	appeared	within	1 to 5	years	after	infection.
37	"	"	"	9 to 10	"	"	"
24·7	"	"	"	11 to 15	"	"	"
14·2	"	"	"	16 to 20	"	"	"
4·8	"	"	"	21 to 25	"	"	"
1·9	"	"	"	26 to 30	"	"	"
·7	"	"	"	31 to 33	"	"	"

It will thus be seen that a very large percentage appeared within the first six and the majority of the cases within the first fifteen years after the initial infection.

These figures could be materially altered, and the period of time would be shown to be still shorter, if those cases were taken into account which begin with loss of pupillary reflex after syphilitic infection, and which do not develop any other symptoms of tabes for some years to come; yet the appearance of the pupillary disturbance may well be considered to have been the beginning of tabes.

III. MULTIPLE CEREBRO-SPINAL SYPHILIS.

I wish in this connection to call attention to this frequent form of syphilitic trouble, upon which I dilated at some length in a paper published two years ago (N. Y. Med. Journal, Sept., 1891). While we may endeavor to localize cerebral or spinal syphilis, we shall find in a very fair proportion of cases symptoms pointing to an involvement of both the brain and the spinal cord. In a case reported with autopsy the special features were: first, a spastic paralysis of the cerebro-spinal type; second, recovery from this attack; third, a second attack of spastic paralysis of upper and lower extremities with cranial-nerve involvement. The history of this case is of sufficient importance to warrant its reproduction here.

R. K., a Lithuanian, aged thirty-seven years, married eighteen years, was an inmate of the Montefiore Home when I took charge of the service, in November,

1890. From a careful history taken for me by the house physician, Dr. Rosenthal, I learned that her father had died of phthisis fifteen years ago; her mother, five sisters, and one brother were all alive and well; her husband is also alive and said to be in good health. The patient has had two children—a girl, born seventeen years ago, who had some eruption when one year old, which lasted six months; this child died at the age of two years, of croup; a son, aged fifteen years, is living and healthy.

As a child our patient enjoyed good health. At the age of sixteen years she had an eruption over her chest and abdomen, together with ulcers on her legs; no history of other specific symptoms could be obtained. Her first child was born in the second year after marriage; there were no miscarriages or still-births at any time. Patient has been in this country six years. Her husband came to this country eight years previously—say, five years after their marriage. During the term of separation from her husband she was living in Moscow, where she passed through an acute febrile affection, probably typhoid. After coming to this country, six years ago, she began to complain of pains in different parts of the body, more particularly in clavicle and shoulder, also over the liver. There was no swelling as far as she remembers, but she recollects having ulcers on both legs at that time; as soon as one healed another would develop, and so on for four or five months. She had some affection of the throat, lasting about two months. During the summer of 1889 she suffered from headaches and vertigo, fell frequently in the street, but claims never to have lost consciousness. Her mental condition was normal, but she was much distracted by pains and increasing weakness in her legs. In February and March, 1890, she had true projectile vomiting. In April, 1890, she became bedridden, and was sent to Mount Sinai Hospital, where she remained seven weeks and was subjected to antisyphilitic treatment. Her symptoms at that time consisted of headache, vertigo, absolute paraplegia of lower extremities, marked hiccough, obstinate constipation, and retention of urine; catheter was used. In addition, she had photophobia and difficulty of speech; mental condition was normal. Sight and speech disturbances disappeared after fourteen days. When dismissed from hospital (after seven weeks) was much improved. For three weeks remained comparatively well; then the headaches returned, and she fell repeatedly, probably in consequence of weakness of legs, became constipated, but bladder remained normal. In September developed ptosis of the left eye and severe pain over left half of head. In October developed a paralysis of left arm and hand, and, after a few days, paralysis of both lower extremities; became confused in mind and almost demented; mental condition was characterized also by severe depression; developed incontinence of urine and fæces. In this condition was brought to the Montefiore Home late in October, 1890. The house physician reports that he found left ptosis, spastic paraplegia, atrophy of both halves of tongue, and exaggerated reflexes. I first saw her November 4th, three days before death; she was semi-comatose, but I could make out left ptosis and complete ophthalmoplegia externa and interna of left side, partial on right side; spastic paraplegia of upper and lower extremities, with contractures and increased reflexes, more marked on left side than on right. Tongue was atrophied. Sensory examination could not be made, owing to semi-comatose condition, nor could facial paralysis be accurately made out; there was, however, no distortion of face. The coma deepened, respiration became irregular, and patient died November 7, 1890.

I made the diagnosis of syphilitic disease of the central nervous system (meningeal infiltration), with special deposits at the base of the brain.

The autopsy was done late at night, within twelve hours after death. The skull and spinal canal only were opened. The calvarium was thin, and in one or two places almost transparent. The dura was not adherent to the brain; the pia over the convexity was congested, but not adherent to any part of the cortex, nor were any gross changes noticeable until the brain had been removed. At the base the great thickening, almost leatherlike, of the pia in the interpeduncular space was very evident; the optic nerves were very much swollen, while all the other nerves appeared thinner than normal and tightly constricted by the thickened pia; the pia could not be removed from any part of the crura, pons, or medulla without injuring these parts. Through the pia the gummatous lesion in the right half of the pons could be detected; this had evidently extended also into the left half. On sections through the pons these changes can be best studied. The spinal dura was found very much thickened; otherwise the gross appearances were normal, except that at various points the areas of degeneration were most distinctly marked, and it was also plain to the naked eye that the ordinary limits of degeneration were not respected. In Plate XX, Fig. 4, it will be seen that a very large area is diseased. Microscopically, it was evident that the syphilitic infiltration had insinuated itself as far as the area of secondary degeneration. The brain and cord were hardened *in toto* in bichromate-of-potassium solution of increasing strength, and later on in alcohol. Sections have been made through the cortex, the ganglia, the pons, the medulla, and at various levels of the cord. A very careful examination was also made of the vertebral and basilar arteries.

Microscopical Examination.—The vertebral and basilar arteries showed typical syphilitic arteritis. In all specimens the lumen was very much narrowed by a small-celled proliferation of the walls; in some the intima was the part most affected, but in other specimens, and often in different parts of the same section, the intima had been but little encroached upon, while the membrana elastica was lost in the mass of granulation tissue and the adventitia was much thickened, showing cellular proliferation. Sections through the cortex, ganglia, and quadrigeminal region did not present any morbid changes in the brain substance.

In the pons, on sections stained with picrocarmin and according to Weigert's hæmatoxylin method, the lesion destroying the right pyramidal tract, and invading the left, was made evident (Fig. 1).

This area is marked by a typical infiltration which has led to disintegration of the fibers and of the neuroglia; on several sections much of this detritus has fallen out, leaving gaps in the section; the pontine pia is everywhere adherent and infiltrated; the blood-vessels show specific alteration of their muscular coats, the intima being very much increased and the lumina of the vessels being partially or wholly occluded by clots. In the medulla and throughout neurotic history is absent, the hypochondriasis is apt to disappear even in the face of actual syphilitic manifestations. Thus only a few months ago a young man was referred to me by his physician in Hamburg, for observation on account of the possible development of secondary syphilis and the much more probable development of a marked hypochondriasis. The young man had become extremely observant of himself, had all the aches and pains to which text-books and doctors had ever referred, and was in mortal dread that the world would soon be able to know that he had acquired syphilis; when, lo and behold! a very distinct mucous patch appeared upon the tongue, then in the corner of the mouth, and the syphilis could have been apparent to every one. But the young man's good neurotic history helped him to "face the music," and in a very short time he determined to set to work to have his syphilis cured and to disregard every other sentiment in the matter. I have no doubt, if he had been predisposed to mental disease, that upon the appearance of secondary symptoms his hypochondriacal tendency would have been markedly increased.

Maniacal excitement occasionally follows upon syphilitic infection. I have seen this in a young man, twenty-one years of age, who had acquired syphilis six months before my first acquaintance with him, when he was in an attack of acute mania. No special cause could be found; alcoholic and sexual indulgence were not excessive, and there was no other explanation for this state, except that his general condition had deteriorated a little in consequence of the rather severe treatment he had been subjected to for the cure of syphilis, his stomach having been thoroughly upset by the constant use of mercurials and iodides, and in this way his general nutrition had suffered very much. As I concluded that he had had enough specific treatment for a time, I had him carefully fed and watched, and within a period of three weeks every symptom of mania had disappeared, and the man made a full recovery. This can hardly be called a case of true syphilitic mania, for I have in the history insinuated that the general depreciation of nutrition was more apt to have been the cause of this mania than the syphilitic virus itself.

Temporary or Transitory Dementia is a much more frequent manifestation of syphilis. I do not find this form distinctly recorded in any of the ordinary works on syphilis, and yet I have seen at least three examples of it within the past year in private practice, and therefore wish to make a short record of this form in this connection.

The patients have been men, under thirty-five, each one of whom had acquired syphilis a few years previously. In two of them there had been some alcoholic indulgence and also some sexual excesses. The patients were suddenly seized with visual and auditory hallucinations, with very slight fever, which lasted for a few days, followed by a condition of mental confusion which deepened into semi-stupor, in which the patient remained for some weeks, and then made a complete recovery, barring a very slight mental weakness in one case—to be sure, the case of a man who, before he had acquired syphilis, and before these mental symptoms had appeared, had not showed any marks of mental brilliancy. In all these cases there was absolute sluggishness of the pupils, both to light and during accommodation, during the period of confusion and semi-stupor. In one of these cases the knee-jerks which were absent have now returned; in the other two the knee-jerks were absent from the very start and have remained so to this day, although the mental condition has gone on to complete recovery. In addition to this transitory dementia another form occurs, also due to syphilis, which may well be spoken of as the terminal dementia following all sorts of cerebral accidents due to syphilis. Thus patients who have had ocular palsies, persistent headaches, several attacks of hemiplegia, possibly a cerebro-spinal paralysis, consisting of paraplegia of upper and lower extremities, together with cranial nerve involvement, and double optic atrophy leading to complete blindness, pass into a condition of gradually deepening dementia—a dementia which seems to be distinguished from all other forms by the very remarkable remissions that occur. Thus in one case now under observation the dementia had become so extreme that the patient was practically nothing but a vegetating organism; his mind was a complete blank, yet when it was least expected he rallied and recovered to such an extent that he was again able to read his newspaper, to converse fairly intelligently with his surroundings; but remained in this fortunate condition only a very short space of time, when he again sank into a condition of complete dementia, in which he now is, and probably will remain to the end of his days. It may be claimed by some that these cases are simply modifications of dementia paralytica; but there are so many points of difference, and they depart so widely from the ordinarily received type of dementia paralytica, that we may well consider them worthy of a special classification.

Dementia Paralytica.—This is by far the most frequent form of mental disturbance due to syphilis, and gives rise to very much the same questions as were discussed with regard to tabes. The clinical symptoms of dementia paralytica are familiar to every one; they consist, in brief, of a gradual deterioration of all the mental faculties, of a change in the person's character and habits; delusions of grandeur, often of the most extravagant sort, are apt to be present, but absent also in not a few instances. Apoplectic and epileptiform attacks are apt to occur, readily increasing the dementia which has been gradually coming on. Together with these mental symptoms we are apt to have unequal pupils, the Argyll-Robertson pupil, or possibly complete immobility of the pupils; tremor of speech and of tongue; exaggerated reflexes in many of the cases; diminished or abolished reflexes in others, particularly in those tending to the development of tabes. This complex of symptoms is unmistakable, and yet cases occur in which the diagnosis, particularly in the earlier stages, can not be readily made, and the question very often arises whether in a given case the diagnosis shall be of dementia paralytica (general paresis of the insane) or syphilitic dementia. This alone points to the acknowledged close resemblance between the two forms of disease, and it would be better to regard dementia paralytica rather as a convenient clinical term for a large number of cases than as a disease which has rigid pathological limitations. The typical dementia paralytica is due to a chronic form of meningitis of the convexity, finally leading to atrophy of the brain. If we remember that syphilis of the convexity is very apt to result in a cortical encephalitis or in a meningo-encephalitis, we have good reason to expect that the symptoms of cortical brain syphilis and of dementia paralytica should be very much the same. Mendel (Progressive Paralyse der Irren, Berlin, 1880) has shown by his experiments on dogs by the use of centrifugal force, that persistent hyperæmia within the cranial cavity, and particularly of the cortex, will finally result in a condition which strongly resembles progressive paralysis in man; and if we keep in mind that syphilitic disease leads to marked disturbances of circulation through its effect upon the arterial walls, we have a hint given us how syphilis may lead to the development of dementia paralytica.

But aside from these reasons derived from a study of the pathological anatomy of these two conditions, there are sufficient clinical studies which go to prove that there is a strong causal relationship between syphilis and paralytic dementia. First of all, the very frequent development of tabes after dementia paralytica and of dementia paralytica after tabes, proves the close relationship between these two diseases; and since tabes is beyond a doubt a form of syphilitic disease, there is sufficient ground for thinking that dementia paralytica bears the same etiological imprint. While no one has as yet given such careful statistics of dementia paralytica as Erb has of tabes, the percentage of syphilis in cases of dementia paralytica has been stated to be high enough by a number of different observers. Fuerstner,* who is opposed to the relation of syphilis to dementia paralytica, claims but thirty-two per cent of syphilitic infection in cases of dementia paralytica, while Snell claims seventy-five per cent of syphilitic infection in his cases, and Rohmell, 77·2 per cent. Obersteiner made a good point by proving that syphilis was present in 21·6 per cent of cases of general paresis, but present in only 4·1 per cent of other psychoses; and the statistics of other observers, Lange, Nasse, etc., have fully borne out these statistics. Rumpf has analyzed very carefully fifteen cases; in three of these syphilitic infection was improbable; in ten cases, however, there was positive proof of specific infection.

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* Cf. Rumpf's Monograph, p. 283–286.

My own experience also is in entire agreement with those who consider syphilis to be of quite as much importance in the etiology of dementia paralytica as it is in that of tabes. The same is true of dementia paralytica as might have been said of tabes, that in cases occurring particularly early in life syphilis is invariably present.* Thus I have the records of a case of a young man of twenty-four, who passed into a very typical general paresis three years after the initial infection; and of another patient of only twenty-three, who had acquired syphilis at the age of twenty-one, within six months thereafter developing symptoms of irritability of temper, unusual extravagance, loss of memory, and soon went into a rapid decline, in which not a single symptom of typical dementia paralytica was wanting; the patient finally dying in Bloomingdale Asylum within two years of the first onset of mental symptoms. In both these cases the neurotic element was marked, as both young men came from families in which mental disease is a very frequent occurrence. Although it is generally believed that hereditary predisposition has very little to do with the causation of general paresis—a view to which I am willing to subscribe—it is still evident enough that hereditary predisposition, when added to syphilitic infection, proves fertile soil for the development of general paresis.

The above remarks will justify us in having considered dementia paralytica in a special chapter on syphilis of the central nervous system. The important point will be to decide in a given case whether the diagnosis of genuine dementia paralytica is the more probable one, or whether the case may not be one of brain syphilis, or, better said, syphilitic dementia. The only points of differential diagnosis that are at all reliable would be these: First, the very early development of the symptoms after the initial infection; next, the prolonged remissions, which, after all, are never quite as marked in typical general paralysis as they are in typical cases of syphilitic brain disease; and, lastly, the association of symptoms known to be due to syphilis rather than as a part of general paralysis would clear up the diagnosis. Let me add the following case, which was instructive because the young man was supposed by the experienced physicians at Bloomingdale to be a typical case of dementia paralytica, and yet recovered his mental faculties completely, and for several years afterward presented the typical symptoms of multiple cerebro-spinal syphilis:

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* Strümpell reported a few years ago the occurrence of dementia paralytica and tabes in a girl of thirteen (Neurol. Centralbl., 1888).

In April, 1890, I was asked to see D. S., a young man thirty-one years of age, single, who had led a very eventful life; had been a heavy drinker, and had acquired syphilis, for which he had been treated. Three years before he became acutely demented, and was taken to Bloomingdale Asylum, where he was entered as a case of general paresis. After a stay of eighteen months he had sufficiently improved to be allowed to leave the asylum. I saw the young man about nine months later, when he told me that while in the asylum he began to notice a great difficulty in walking. On examination, I found spastic paraplegia of lower extremities, no marked involvement of upper extremities, great increase of reflexes in all four extremities, very marked and constant tremor of the hands (not merely intention tremor), marked facial tremor, and a peculiar speech disturbance, which reminded one in part of general paresis, and was something akin to the scanning speech of multiple cerebro-spinal sclerosis, yet different from both.

I was willing at one time to consider the case a multiple cerebro-spinal sclerosis (nystagmus, however, was absent), until a very marked remission occurred, during which the mental symptoms cleared up entirely, and the patient began to read and write, as of old, with absolute correctness. He spoke intelligently of all things, and his spastic paraplegia made considerable improvement under antisyphilitic treatment. This remission was not destined to last very long, for after a few months the old symptoms returned in full force, speech became very heavy again, the spastic condition increased, the hands became tremulous, and marked hypochondriasis developed, which disappeared again.

IV. SYPHILIS OF THE PERIPHERAL NERVOUS SYSTEM.

From a practical point of view this section is the least important of those we have to deal with, since the cases of syphilis of the brain and spinal cord are at least ten times more frequent than those in which the manifestations of syphilis are exhibited, chiefly in the peripheral nerves. A specific primary process in the peripheral nerves is a still greater rarity; such cases as we do see are the result of a gumma, or of infiltrated glands pressing upon part of a nerve plexus. In keeping with the general structure of the peripheral nerves we may have disturbances of sensation, subjective and objective; and we may have paralysis or disturbances of some one of the special senses as a result of syphilis.

Syphilitic neuralgia is a diagnosis not infrequently made, but I have very grave doubts as to the frequency of this condition, and believe that the accidental co-operation of other causes is often overlooked. We may and often do find marked alcoholic tendencies in persons who have had syphilis; a neuritis developing in such a person need not, therefore, be of specific origin, and is much more probably a simple alcoholic neuritis. It is well to remember, however, that the co-operation of two distinct etiological factors, like alcohol and syphilis, leads to more disastrous results than if one alone were in question. Nor is it fair, on the other hand, to infer too much from the therapeutic test, and to claim that every trigeminal neuralgia, for instance, which has resisted other forms of treatment and then yields to the iodide or mixed treatment, is an instance of a syphilitic neuralgia.

The headaches that are so characteristic of syphilitic disease may be considered the clearest proof of the occurrence of neuralgic affections in the wake of syphilis, for the headaches are due to the disease of the meninges, and the meninges are supplied by the ramifications of the trigeminal nerve. It is not always easy to distinguish the frequent form of syphilitic headache from those that are more distinctly of a neuralgic character; but it is reasonable to believe that the diffuse headaches of syphilis are due to a general infiltration of the meninges of the convexity, whereas the typical trigeminal neuralgia that sometimes occurs in syphilitic subjects may be caused by patches of meningeal infiltration at the base around the fifth nerve, at its point of emergence from the base of the brain. The occurrence of some slight motor disturbance in connection with sensory symptoms might be expected in such cases. Aneurisms of the internal carotid, which might be considered an expression of syphilitic disease, have been known to be the direct cause of trigeminal neuralgia. Romberg has reported one such case that is of unusual interest. I myself have recently had an opportunity of seeing an uncommonly interesting case of this description, in which the diagnosis of aneurism was made by exclusion, and the possibility of syphilis as the cause of aneurism had to be conceded. Although the diagnosis is not a positive one in this case, I will give the clinical history, in view of the rarity of this special form of disease:

Mr. A. K., sixty years of age; married; four children; sixteen years ago had perityphlitis; no second attack. Has been a moderate smoker, moderate drinker, and denies ever having had syphilis; had gonorrhœa twice. Last February had intense pain over the right eye, and in the course of one week from the onset of this pain developed an anæsthesia in the entire right half of the face, first over forehead and then over cheek, and finally over the right half of the tongue. Soon after this began to experience difficulty in mastication. In May went to Europe and consulted Professor Erb. At times he had spasms of masseter muscles, so that he could not separate the jaws. Noticed no weakness of upper or lower extremities, no difficulty in micturition. The man is active and unusually vigorous for his age. The examination revealed absolute anæsthesia over right frontal region, right cornea and conjunctiva, middle of right half of tongue, and middle of right half of mouth. The right pupil very sluggish to light and accommodation, left pupil less so. All ocular movements perfect. Central defects of vision and limited vision. No facial paralysis. Grasp of both hands good. Knee-jerks normal. All electrical reactions good except in the right temporal and masseter muscles, which are largely atrophied. The central defect of vision in this case was accounted for by the existence of retinitis pigmentosa, which Dr. Knapp asserts is sufficient to account for the peculiar defects of vision.

From the slow course that the case had taken, from the entire absence of all signs which would lead to the inference that there was malignant disease, and in view of the fact that all the symptoms pointed to a compression of the entire trigeminal nerve at the base, I concluded that an aneurism of the internal carotid was the most probable diagnosis, with the probability also of latent syphilis as the cause of this rare association of symptoms.

Rumpf reports an unquestionable case of syphilitic neuralgia of the trigeminal nerve in which the microscopical diagnosis was made during life by an examination of a portion of the resected nerve. In this case there was a distinct diminution of sensation in the distribution of the second branch of the trigeminus. The pain was persistent, and resisted every form of medical treatment. The history of the patient brought out the fact that some twenty years previously he had acquired syphilis. He was thereupon placed upon very large doses of the iodide of potassium which, however, were of no avail, and finally the operation was undertaken by Prof. Trendelenburg. The operation was not entirely successful, for a proliferating mass starting from the bone had encircled the nerve and could not be extirpated as fully as was desirable. The neuralgia was not improved by the operation, and the patient died four months later with cerebral symptoms. Rumpf, who made the microscopical examination, states that the proliferating mass was a true granulation tumor, and that the nerve was permeated by granulation tissue. In this case the blood-vessels were not diseased, and Rumpf thinks that it is due to this fact that the disease resisted medical treatment; he describes the pathological condition as a perineuritis syphilitica.

Neuralgic affections of a specific order also occur in the course of the cervical, the brachial, and the lumbar plexus; even sciatica may occasionally be the expression of syphilitic disease. Here, again, Rumpf supplies an interesting study. He reports a case of a woman sixty-three years of age who complained of typical right sciatica. The pains were particularly severe between the hours of 1 and 4 A. M. The woman had been married since the age of thirty-five, and had one healthy daughter. Her husband, too, was healthy. The treatment of the case was entirely unsuccessful until the patient herself confessed that at the age of thirty she had become infected with syphilis. She was given large doses of iodides and disappeared from treatment, but a little while later was run over and killed. At the autopsy, Rumpf found an atheromatous condition of the aorta with slight aneurism formation. There was a decided dilatation of all the veins in the spinal canal around the lumbar cord and the cauda equina. The walls of the veins were distinctly thickened. Rumpf thinks this sufficient proof, together with the changes in the aorta, of syphilitic disease. It is to be regretted, however, that the sciatic nerve was not examined, for if the sciatica was due to the central lesion, there would in all probability have been pain along other divisions of the lumbar plexus.

I wish to direct especial attention to the very frequent vague nerve pains in syphilitic subjects. These pains constitute a very distressing symptom in many of the cases of syphilis of the central nervous system, and in one case previously alluded to in this paper, paræsthesiæ in the upper and lower extremities, and above all constant burning sensations in the toes and heels, are as annoying as any other symptoms which the patient presents. These pains are apt to increase, together with a change in the other symptoms, showing an exacerbation of the morbid process; and I have always regarded the occurrence of such pains as an additional reason either for increasing the specific treatment or for subjecting the patient to a renewed course of treatment.

Syphilitic disease of the cranial nerves we have referred to before, and need not be considered in this connection.

Diagnosis.—The differential diagnosis of syphilitic disease of the nervous system could not be attempted without reviewing all the clinical facts reported in previous sections of this chapter. In this connection I merely wish to repeat the caution that the diagnosis be made upon the clinical picture presented in a given case; whether we can prove, or the patient conceals, the existence of initial infection, we should be able to recognize the clinical types of syphilis of the nervous system independently of the etiological factor. In case initial infection is well established, we should not be misled into the error of attributing all the nervous symptoms with which the person may happen to be afflicted to syphilis, for there is no reason under the sun why a person who has had syphilis may not have any of the many forms of nervous disease to which those who have never had syphilis are liable; and, on the other hand, we may safely make the diagnosis of cerebral or spinal or cerebro-spinal syphilis if the clinical symptoms correspond to a given and well-recognized type of disease, whether or not the initial infection can be proved to have occurred, and if remarkable remissions occur upon treatment by mercury do not consider this absolute proof of the specific nature of the disease. The following is a very remarkable instance of this kind:

Mr. K., aged forty, a sufferer for many years, has had attacks of left hemiplegia, with persistent headaches, and occasional epileptiform seizures (general convulsions); has a tremor which was diagnosticated by several eminent European *confrères* as that of multiple sclerosis; it was probably a hereditary form of tremor. In the autumn of 1891 headaches became more intense, epileptic seizures more frequent; went into a condition of coma. I was consulted, and urged very vigorous mercurial inunctions. Improvement was rapid; all symptoms disappeared; "Never felt so well in my life"; relapse set in some weeks later, and patient died. At the autopsy I found not a gumma, but a large *glioma* of the fronto-parietal area of right side.

Prognosis.—It has been the custom to give a favorable prognosis in every case in which distinct specific disease has been diagnosticated. This is not a safe rule to follow, for it should be remembered that a hæmorrhage or thrombosis, for instance, due to syphilitic disease of the arteries, is fully as grave a matter as though these conditions were due to atheromatous or other disease of the blood-vessels, and, if anything, the danger of relapses is even greater in the case of specific disease than of the other morbid processes.

In his brilliant lectures on syphilis of the nervous system, Gowers (Syphilis of the Nervous System, 1892) takes an extremely pessimistic view of specific disease affecting the brain, the spinal cord, or both combined. He urges, and supports his argument by substantial facts, that the disease is practically an incurable one; that we may cause the manifestations of the disease to disappear for a time, but that the disease itself, while it may remain latent for a long period, is never thoroughly eradicated from the body. Every one will be ready to concede the truth of this statement; but, on the other hand, it is safe to say that the manifestations of syphilis yield to the proper treatment far more frequently than the same symptoms would if due to any other morbid process. I beg the reader to recall those serious cases, particularly of spinal-cord syphilis, to which I have referred above, in which most remarkable improvement had set in as a result of antisyphilitic treatment—an improvement which would never have resulted if syphilis had not been the causative factor of the disease. I can not, therefore, share Gowers's pessimism, and am rather inclined to urge a more favorable prognosis because of the syphilis, but would always insist upon the possibility of relapses of cerebral and spinal symptoms whenever the disease is distinctly due to specific infection. Let us not forget, also, that much of the damage done by syphilitic disease may be beyond repair, and that to this extent the prognosis becomes a serious one. If softening due to thrombosis in a cerebral artery has given rise to a hæmorrhage which has resisted every form of treatment for a period of many months or even of years, or if the symptoms in a given case of spastic paraplegia resist all treatment for a long period of time, if there is evidence that secondary degenerations have set in, medicinal treatment may have some influence in the way of checking the further spreading of the disease, but it can not undo the area of softening which has been established, nor the secondary degenerations which have followed upon an initial specific focus of disease in the brain or spinal cord. The prognosis, too, in any case will depend very largely upon the general condition of the patient, upon the stage of the process at the time of observation and treatment; and he who sees many cases of syphilitic disease of the nervous system will come to the conclusion that no cast-iron rule can be established, but that each case must be judged according to its individual merits. But I am willing that a somewhat more favorable prognosis should be entertained because of the preceding syphilitic infection, since this hope of greater improvement will lead to far more persistent and more energetic methods of treatment.

Treatment.—Whether syphilitic disease happens to attack the brain, the spinal cord, or the peripheral nerves, the treatment will and should be very much the same. Since disorders of the nervous system following upon syphilis have generally been regarded as tertiary manifestations of syphilis, it has been the rule to maintain that the iodides alone were the all-powerful drugs. It is for this reason that the value of mercurial treatment is not as fully recognized as I think it should be. From my own experience with this class of disorders, to which I have given considerable thought, I am willing to say that I should prefer to do without the iodides rather than without mercury; but the two combined unquestionably yield better results than either one will if given singly. The method of administration is of much importance. As for the iodides, I have been in the habit of using the iodide of sodium to the exclusion of the potassium salts. I base this practice upon the unfavorable action, if long continued, of all potassium salts upon the heart; and since in so many cases of these disorders the circulation is weak enough, it is well not to add to the injury already done, by the drugs which we exhibit. The iodide of sodium is best given in a saturated solution, each drop containing a grain of the salt. Begin with ten drops of this saturated solution, given three times daily in some alkaline water before meals, and long enough before meals to enable thorough absorption to take place before other ingesta are carried into the stomach. I prefer to give the drug in Vichy, in Selters, or some other alkaline water rather than in milk. According to the condition of the patient, the dosage can be increased by two to five drops daily until one hundred to one hundred and fifty drops three times daily have been reached, or until the improvement that has set in makes it unnecessary to advance to the higher dosage. If no improvement results after the patient has reached these large doses, say of one hundred to one hundred and fifty grains three times a day, it is well to quit this form of treatment for a time; but another attempt should be made in exactly the same way, beginning with smaller doses and gradually advancing; and others will experience what I have seen again and again, that these renewed attempts at this treatment will finally bring about a decided change for the good in the symptoms of the patient.

In addition to the iodide treatment, begin at an early day with inunctions of mercury. In children, I am fond of using a ten-per-cent oleate of mercury; in the adult, the unguentum cinereum is decidedly the best form in which to administer mercury. I can not insist strongly enough upon the advantage of inunction treatment, for I am firmly convinced that mercury is not as active if taken into the system in any other way, and I will even go to the length of stating that I have never been able to convince myself of marked improvement in any case in which mercury was administered *per os*, either in the form of calomel, of corrosive sublimate, or of the protiodide of mercury. It is also a matter of common experience that the inunctions of mercury can be pushed to a very considerable extent without producing any salivation, the patient having one to two drachms of the blue ointment rubbed in daily for a period of many weeks and even months; whereas the administration of comparatively small doses of the mercurial salts by the mouth is very apt to produce disagreeable salivation in a comparatively short period of time. It is because of this salivation and on the ground of inefficiency that I object to the old and time-honored method of prescribing the iodides with mercury in the form of a solution. The good that results from this medication I am confident is due to the iodides alone.

In addition to the administration of the mercurials and the iodides, the proper treatment of syphilis of the nervous system requires a careful observation of the general nutrition of the patient. In almost every case in which the specific treatment has had to be persisted in for weeks or months, it would be necessary to quit this treatment for a time and to place the patient upon a treatment of blood and nerve tonics. For a time, iron, arsenic, quinine, and even strychnine can be substituted with marked benefit to the patient, who in a few weeks may have improved sufficiently to warrant the renewal of specific treatment.

The diet should be carefully attended to; it should be nutritious, in as small bulk as possible, and should not contain any articles of food which are apt to impose unusual tasks upon the gastro-intestinal tract. Let the diet consist of meat, fish, eggs, milk, the plain vegetables, little starchy food, no salads, and no sweets.

Hygienic measures should be carefully regarded, and, above all, it will be found advantageous to institute regular hydrotherapeutic measures, including warm baths several times a week, and the more tonic lukewarm, followed by colder washes and douches, which may well be given every morning immediately upon rising.

It is the combination of general hygienic and hydrotherapeutic measures, together with mercurial and iodide treatment, that has placed various watering-places in high favor with the medical and the general public. In this country the Hot Springs of Arkansas are the Mecca of patients suffering from any form of syphilitic disease of the nervous system. In Europe, Aix-la-Chapelle and Nauheim are at the present day the resorts most frequented by this class of patients. There would be naught but commendation for these places if a little more discrimination were shown in the treatment of specific disease of the nervous system, and if the physicians in charge of these various springs would learn to treat cases upon their individual merits and according to the needs of the individual patient.

EXPLANATION OF PLATE XX.

Fig. 1, section through pons, showing gummatous infiltration (*g*) of ventral portion. Specimen stained with Weigert's hæmatoxylin. Low power.

Fig. 2, ventral portion of medulla, showing thickening of pia and small-celled infiltration of substance of medulla ; also thickened blood-vessels. Specimen stained in picrocarmin. Low power.

Fig. 3, portion of the same more highly magnified, showing infiltration of pia and of substance of medulla (*a*) and typical syphilitic endarteritis ; marked thickening of and cellular proliferation in intima (*i*) narrowing of the lumen ; the membrana elastica not visible ; cellular infiltration of adventitia (*b*) also.

Fig. 4, section through dorsal cord (ventral portion), showing leptomeningitis specifica and infiltration of substance of the cord. Low power as above.

Fig. 5, a portion of the same more highly magnified ; very marked thickening of pia ; cellular infiltration seen best in that portion of the pia which projects inward ; infiltration of substance of cord.

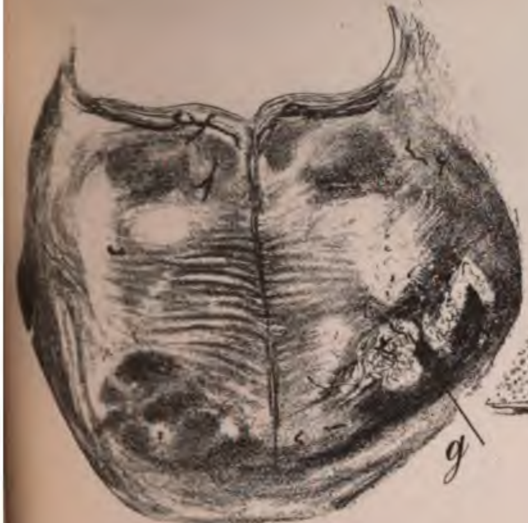


Fig. 1.

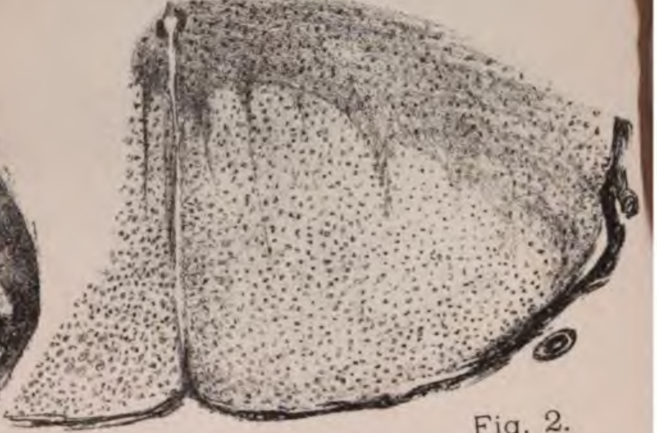


Fig. 2.

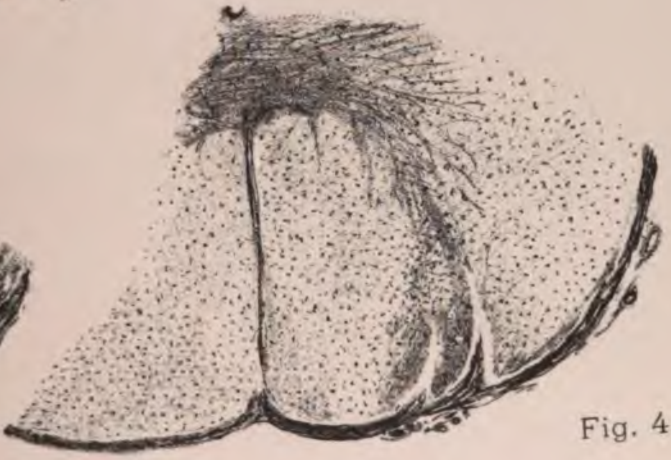


Fig. 4.

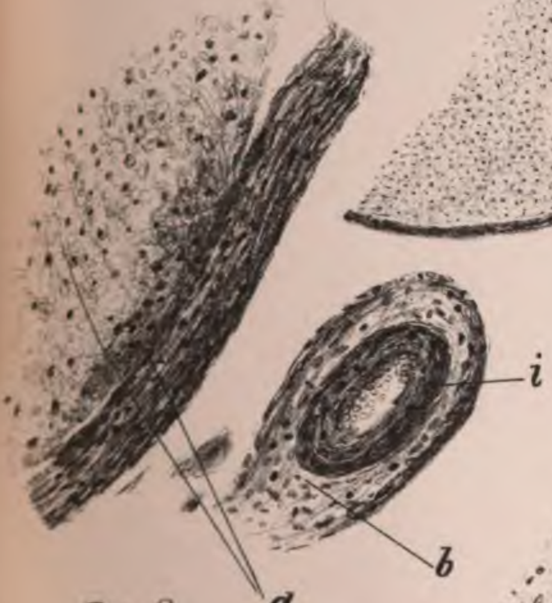


Fig. 3.

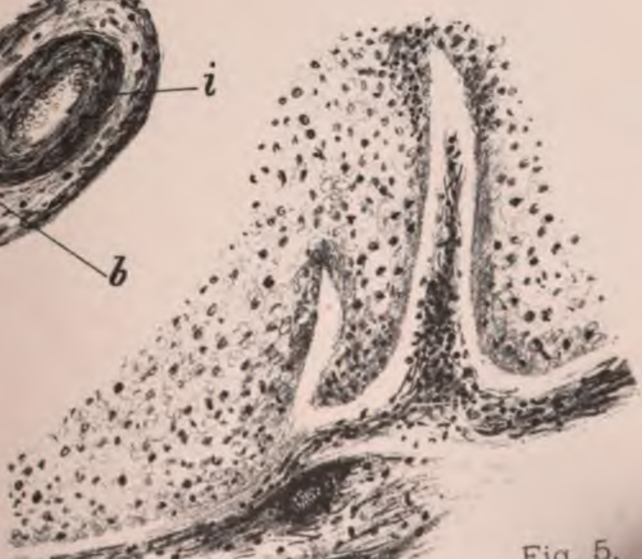


Fig. 5.

HEREDITARY SYPHILIS OF THE NERVOUS SYSTEM.

By WILLIAM N. BULLARD, M. D.

Hereditary syphilis of the nervous system may affect any portion of this system, or any portions simultaneously. For purposes of convenience we separate the nervous system into three divisions: 1, the contents of the intracranial cavity (the cerebrum, cerebellum, pons, and medulla, with their membranes); 2, the spinal cord and its membranes; and, 3, the peripheral nerves. Portions of any two or of all three of these divisions may be diseased simultaneously or in succession in the same subject. Moreover, although lesions of the nervous system due to hereditary syphilis may occur without the evidence of the present or former existence of lesions due to the same cause in other portions of the body, nevertheless, in the cases which can *with certainty* be classed under this heading, lesions elsewhere have usually been found. This is due in part to the fact that until lately lesions of the nervous system due to hereditary syphilis could not be recognized by themselves, but only when occurring in conjunction with the recognized symptoms of hereditary syphilis in other organs.

In considering these affections from the clinical standpoint we are at once brought face to face with a serious difficulty. A large proportion of these, due indirectly to this cause, show no certain characteristics by which they can be recognized in the autopsy with the means at present at our disposal. Hence many conditions which are probably due to hereditary syphilis can not be absolutely proved to be thus caused, and we can only premise this probability on account of the frequency of their occurrence in connection with other known symptoms of this affection. Many symptoms thus produced are, moreover, similar to those produced by other causes, and have hitherto been commonly referred to other and more readily recognized diseases or affections, as rachitis, scurvy, and marasmus, especially when they are frequently found in connection with the symptom-complexes known under these names. When symptoms of this character occur without any other definite symptoms of hereditary syphilis, and especially if they do not prove amenable to antisyphilitic treatment, we can not without further evidence than we now possess include these cases as syphilitic, however much we may personally be inclined to consider this the case. Even the proof from antisyphilitic treatment is not conclusive. Other diseases may sometimes be cured or helped by it, and, *per contra*, *very frequently* lesions or affections due to hereditary syphilis can not be cured by such remedies.

Hence, in dealing with affections occurring in or with hereditary syphilis, we are forced to exercise especial care to distinguish between those (*a*) in which we have pathological proof of their specific origin and (*b*) those in which no such proof exists. Of the latter class, again, we have two series of symptoms or symptom-complexes: the one, where the symptoms or lesions seem only or most usually to occur in cases where hereditary syphilis exists, and where, therefore, the probability that this is the cause of their existence is very great; the other, where the lesions occur also in other affections, or may be considered as the result of any general weakening of the system, and hence liable to occur with any chronic wasting disease of infancy or childhood, rather than as due to a specific poison. Lastly, there are many symptoms and conditions which occur in the heredo-syphilitic the connection of which with the primary condition is more than doubtful.

In attempting to differentiate between those symptoms which are due directly or indirectly to the specific poison and those symptoms, affections, or conditions which occur frequently in the heredo-syphilitic but are not thus caused, we must therefore use extreme caution, examine all evidence thus far obtained carefully and impartially, and use all means at our disposal to acquire more information. This differentiation is, unfortunately, at the present time not wholly possible. But, so far as we may in this article, we shall make a definite distinction between those symptoms and conditions which can be pathologically proved to be due to hereditary syphilis, whether directly or indirectly; those which seem with considerable probability to be due to this cause, although no pathological evidence in this direction exists; and, lastly, those which seem to be only accidentally coincident with this affection and not connected with it in origin.

Hereditary syphilis of the nervous system manifests itself frequently by a multiplicity of symptoms and lesions; and, although this is not perhaps so important a characteristic as in the acquired form in the adult, it nevertheless dominates many of its forms, and renders the symptom-complex as a whole more varied and complicated than it would otherwise be.

Pathologically we have the same form of lesion in hereditary syphilis that we have in the acquired condition, and, with the exception of the initial lesion we are theoretically supposed to be liable in hereditary syphilis of the nervous system to all or any of the lesions found in acquired syphilis thereof. This supposition may be actually true, but practically we see certain lesions with much greater proportional frequency in hereditary syphilis than in acquired syphilis, and others are much more common in acquired syphilis. The clinical picture is in many ways different in the average case. The percentage of frequency in which given lesions appear in the two forms of syphilis seems distinctly different. This may undoubtedly be due in part to the fact that certain lesions in the hereditary syphilitic do not manifest themselves so plainly, or that they are overlooked. It is probably also due in part to the age of the subject. As hereditary syphilis manifests itself largely in fœtal life, or in the early years of infancy and childhood, while the acquired form is on the whole a disease of adult life, the organs and tissues affected are in somewhat different conditions in the two cases. In hereditary syphilis the nervous system is apt to be affected while it is still undeveloped and in the process of development; while in the acquired form it is most frequently attacked after its development has been completed, or even when undergoing the physiological degeneration. For this reason lesions producing or resulting in nondevelopment of the nervous system are largely due to the hereditary form. Syphilis acquired in infancy or childhood may naturally cause such lesions, but this is proportionately much rarer. Yet even these two causes do not seem to account wholly for the difference. As examples, I would refer to the *comparative rarity* of affections of the cranial nerves, with the exception of the optic, and of the symptoms of large cerebral tumors (gummata) in hereditary syphilis.

In order to render as clear as possible this complicated subject, we shall consider first the lesions of hereditary syphilis in relation to their anatomical position, and later the complexes of symptoms as shown in typical cases.

Anatomically we divide the lesions into three classes: I, the cerebral, under which are included all intracranial lesions, except those of the cranial nerves; II, the spinal; and III, the peripheral.

I. CEREBRAL LESIONS OF HEREDITARY SYPHILIS.

As a prelude to the consideration of intracranial lesions in hereditary syphilis, it is necessary to say a few words in regard to the cranium itself, because its condition and affections have so close a relation to the intracranial, both as regards diagnosis, prognosis, and treatment, and because the physician who carefully considers the intracranial structures must also examine carefully all cranial conditions in every case. Fournier has described several varieties or peculiarities found in the crania of heredo-syphilitics. He divides them into those manifesting themselves in the shape of the forehead, and those which appear in other portions of the cranium. Of the first division there are three types:

1. The Olympian forehead, high, broad, and either straight vertically or bulging forward somewhat.

2. The forehead with lateral bosses. These are usually enlargements or hyperostoses of the frontal eminences.

3. The keeled forehead, in which an eminence or hyperostosis occurs in the median line vertically.

Fournier also describes four varieties of cranial peculiarities in other portions of the cranium:

1. Cranial bosses.

2. Broadening of the cranium from the position of the parietal bones, which appear as if pushed apart or outward. Under this heading also he places the natiform skull of Parrot.

3. Asymmetry of the cranium.

4. Hydrocephalic cranium.

To these we may add microcephalus and the rachitic skull.

It will at once be seen that we have in this simply a classification of convenience, setting apart peculiarities of different natures and causations without any reference to their etiology or pathology, or their relation to the primary disease. Some of these conditions appear to be direct results; others indirect results of the constitutional cachexia; and others, again, so indirect or unconnected as to be fairly considered only accompaniments.

To make clear this subject, we must for a moment consider what the results of the direct action of inherited syphilis upon the bones of the cranium really are, and which of the conditions mentioned are thus produced. We can then consider the conditions caused indirectly, and finally those which are only accidental or remote.

The cranial deformities directly due to inherited syphilis are chiefly caused by the various forms of chronic heredo-syphilitic osteitis. Parrot divides these into the atrophic and the osteophytic.

Atrophic Osteitis.—Atrophic syphilitic osteitis of the cranium is always, or nearly always, of the gelatiniform variety. The parts attacked have the appearance and consistence of an "aqueous fruit jelly." The invasion of the hard parts is marked by rapid decalcification. In the cranium this form, according to Parrot, begins directly under the periosteum, and rarely reaches the dura, although he has seen one case where a localized meningitis was set up at the perforation. The lesion may be circumscribed or diffuse. The affected bones when dried have the appearance of worm-eaten wood or cloth.

Osteophytic Osteitis.—The more common form, however, of osteitis in the heredo-syphilitic is the osteophytic. Hyperostoses, as definite superimposed exostoses or bony elevations, may occur almost anywhere on the external surface of the bones. When in unusual and asymmetrical positions they have the strongest significance. Exostoses distinctly superimposed are especially common in the situation of the frontal eminences, and this condition accounts for a portion of the cases of Fournier's forehead with lateral bosses. Where such exostosis exists in the median line of the forehead we have Fournier's keel-shaped forehead. Instead of actual superimposed exostoses, it is not uncommon to find in many children the frontal and parietal eminences considerably enlarged and prominent, both more extended and more bulging than normal, but not horn-shaped or pyramidal. The exact cause of these conditions is unknown, but such an appearance can not be considered as proof of inherited syphilis, though it may turn our attention to the possibility of its existence. Some of Fournier's cases of forehead with lateral bosses apparently belong to this class.

Real hyperostoses or bosses are also found frequently at the periphery of the frontal and parietal bones—at the four corners of the anterior fontanelle. They begin as lenticular, red, or violet elevations, usually spongy, sometimes hard and often rough. When thus situated they present a typical appearance, and to them is due the formation of the natiform skull.

The cranial hyperostosis may assume a more diffuse form, affecting nearly all the external cranial bones. It often extends in these cases from one bone to another, causing an early synostosis and bridging or obliteration of sutures. This hypertrophy of portions of the osseous structure of the cranium is not infrequently combined with atrophy or thinning of other portions (Fournier, Parrot, Barlow, Bridges).

The only other direct lesions of the cranium due to congenital syphilis are the gummata, including gummatous infiltration, with their results. These may occur in any position. They are much rarer than the lesions of chronic osteitis.

The lesions of the cranium which may be considered as directly due to hereditary syphilis are (1) the various forms of chronic osteitis, and (2) gummata, necrosis, etc.

It is not intended to imply here that all forms of chronic osteitis in the cranium are due to hereditary syphilis, but only that that disease produces the forms above mentioned. Some of these forms, as hornlike exostoses, the diffuse hyperostoses, and the exostoses of the natiform skull, are characteristic, but some forms are very possibly due to other causes.

The conditions of the cranium found in hereditary syphilis, and which may be considered indirect or secondary, may be classified according as they are the secondary (remoter) results of direct heredo-syphilitic lesions, or as they are still more remote and due either to the general constitutional cachexia, or to other conditions, as rachitis, which are favored by the weakening effect of the syphilis. Both classes of these conditions from their very nature are not peculiar to inherited syphilis, but are liable to occur under any other conditions where the primary cause exists.

Microcephalus.—By this term we mean not only a small cranium, but a cranium disproportionately small in relation to the rest of the body. The stunted growth, so well known as a symptom of inherited syphilis, naturally affects the growth of the cranium as well as that of other parts of the body, but it is only a part of the general cachexia, is hardly to be considered as a localized symptom, and does not come under this head. The causes of true microcephalus are not fully known. It may in some cases be due to premature ossification of sutures, as is often stated, and might then be caused by a hypertrophic osteitis. Such cases, however, must be rare, and personally we have never seen any where this was proved to be the cause. Where, on the other hand, the microcephalus, as seems to be usually the case, is due to cerebral nondevelopment, if such nondevelopment of the cranial contents be due to inherited syphilis, then the microcephalus may be looked upon as a secondary result of that disease. As, however, it may occur from cerebral nondevelopment arising from other causes, or may possibly be otherwise produced, its existence only suggests more or less remotely the possibility of hereditary syphilis as a cause.

Hydrocephalic Cranium.—The hydrocephalic cranium is due to hydrocephalus. When the hydrocephalus is itself of heredo-specific origin we may consider the form of the cranium a remote result of the syphilis. As, however, the actual frequency of inherited syphilis as a cause of hydrocephalus has not yet been determined, the latter would, in the absence of other signs, not strongly suggest syphilis; but if other signs of congenital syphilis were present, its existence would tend to render the diagnosis more probable.

Asymmetry of the Cranium.—This may depend on many causes. Inferiority in the size of one half of the cranium occurs in company with hemiplegia, the smaller half being sometimes on the side of the paralyzed limbs and then usually forming a portion of a general hemiatrophy, or sometimes on the side opposite the paralyzed limbs. In the latter case it suggests the lack of growth of the cranium over the affected portion of the cerebrum, due to the nondevelopment thereof. Another common form of asymmetry is where one half of the cranium appears to have been pushed forward or backward upon the other. But perhaps even more common is the allied form, in which there exists a simultaneous flattening of the antero-lateral portion of one half of the cranium and of the posterior region of the other half, suggesting strongly the result of pressure exerted on one fronto-temporal and the opposite occipital region at a time when the bones were little resistant. The other forms of asymmetry, except such as are produced by hyperostoses, growths or atrophies already considered, are rare.

One of the more frequent causes of cranial asymmetry is undoubtedly an undue softness of the cranial bones and a weakness of their union, which permits (1) an excessive mobility of the bones, causing more or less easy displacement at times; and (2) a direct yielding of the bone itself, which takes the form impressed upon it by active pressure or even by the mere weight of the head when lying constantly in a given position. To this cause has been ascribed in many cases the flattening of one side of the occiput, but it can not serve as an explanation when this is accompanied by a flattening of the opposite temporo-frontal region. This general softness of the cranial bones is to be carefully distinguished from a softening thereof. The latter term, properly implying an active process, is said to be not infrequent in inherited syphilis, but whether it be due to the direct action of this disease in any cases seems undetermined. Inasmuch as it undoubtedly occurs in rachitis and is so closely allied to the other symptoms thereof, it would seem wiser for the present to consider this condition rather as a sign of rickets than as immediately and directly due to inherited syphilis. On the whole, asymmetry of the cranium does not in itself strongly suggest hereditary syphilis, except where due to the hyperostoses mentioned above.

Rachitis.—This brings us to the consideration of the accompaniments of hereditary syphilis, and to the much-vexed question of the relation between it and rachitis. Rachitis is undoubtedly more closely connected with it than as a mere accidental concomitant. Rachitic symptoms are very prone to occur in children with a heredo-syphilitic taint, and we are justified in considering that the presence of hereditary syphilis constitutes or furnishes a favorable ground for the existence of rachitis. Whether this is due to the general weakening of the system caused by syphilis, or whether there is a more intimate connection between the two, is yet undetermined. The enormous proportion of rachitic children among those hereditarily syphilitic suggests a more intimate relation than that caused by any chronic cachexia. On the other hand, Parrot's view that rachitis is simply one form of inherited syphilis has not been corroborated. There is no doubt but that at present many cases of rachitis exist in which no evidence of syphilis in the ancestors or in the patient can be shown. In our present state of knowledge this is, however, but negative proof.

For our present purposes rachitis will be considered simply as an accompaniment of inherited syphilis, remembering, however, that it is disproportionately frequent. Of the symptoms of this affection with which we are concerned as regards the cranium, there are three: (1) the diffuse softness of the bones and nonclosure of the sutures and fontanelles; (2)

localized softening of the bones—craniotabes—to be carefully distinguished from the localized softening of direct specific origin; (3) the rachitic form of cranium. All these conditions are well known, and are not subjects for discussion here.

The other accidental accompaniments or concomitants of hereditary syphilis are relatively infrequent, and do not require special mention.

INTRACRANIAL AFFECTIONS IN HEREDITARY SYPHILIS.

Affections within the cranium in hereditary syphilis are apt to be somewhat diffused, and are sometimes multiple, affecting more than one organ or one portion of an organ. This diffusion and multiplicity is perfectly natural, inasmuch as syphilis is a constitutional disease, and its manifestations are not confined to any portion of the body, though more frequent in some than in others. In the beginning, however, it will be easier to consider the different processes in the different tissues separately, always remembering that several of these are likely to occur together or in succession in any given case.

This is not the place to enter fully into the pathological anatomy of intracranial hereditary syphilis, but it will be necessary to say a few words in regard to it for the general understanding of our subject. The pathological conditions found within the cranium in this disease are, roughly speaking, the results of three processes: (1) diffuse syphilitic infiltration; (2) localized syphilitic infiltration or gummata; (3) syphilitic endarteritis of the type described by Heubner. The secondary or remoter accidents within the cranium are the results of these processes. Among these we place hæmorrhages, emboli, thromboses, cerebral softening, sclerosis, and atrophy, as well as the retardation or obstruction of development in the brain. As symptoms of these processes and accidents are produced the convulsions and the cerebral or meningeal paralyses, hemiplegiæ, paraplegiæ, or monoplegiæ so frequent in this affection.

Bearing in mind that the symptoms in hereditary syphilis are primarily dependent on these pathological conditions, we hold the key not only to the pathological conditions occurring in each special part, but to the whole mass of clinical symptoms which seems at first to be so mixed, incongruous, and variable, as to be almost incapable of a rational classification.

Affections of the Meninges are of comparatively frequent occurrence in hereditary intracranial syphilis. Indeed, cases of this disease affecting the intracranial organs in which the meninges are not more or less involved are rather the exception. Many of the cases of involvement of the meninges are secondary to lesions of other parts, but the meninges are, on the other hand, often apparently the primary seat of the trouble.

Affections of the Dura Mater.—Hæmorrhages in the subdural and the subarachnoid cavities sometimes occur in connection with the general hæmorrhagic diathesis which often accompanies hereditary syphilis. Waldeyer and Köbner report a case of hæmorrhagic pachymeningitis secondary to gummatous internal periostitis of both frontal bones. Heubner's case of primary uncomplicated hæmorrhagic pachymeningitis is, up to the present time, almost unique. This case is as follows:

The patient, when a few weeks old, suffered from coryza, and had various eruptions and other symptoms evidently of syphilitic origin. In the eighteenth week symptoms supposed to be those of hydrocephalus, and a rapid increase in the size of the head, occurred. General convulsions occurred at this time. The head continued to increase in size more gradually. The fontanelles were very large and the sutures widely separated. A week or two after the first symptoms of cranial enlargement were noticed the patient made irregular forced movements, twisting of the face and movements of the limbs.

About five weeks after the first symptoms the patient died. The autopsy showed a hæmorrhagic pachymeningitis of the vertex and falx, and to a lesser degree at the base. The brain was normal, and its ventricles were not enlarged.

Apart from the hæmorrhagic form a subacute and chronic pachymeningitis is not uncommon. It is often secondary.

Affections of the Pia Mater, whether primary or secondary in origin, are quite frequent. The acute leptomeningitis of hereditary syphilis so closely resembles tubercular meningitis in its symptoms, that in many cases, without the history or the evidence of lesions in other organs, a differential diagnosis is impossible. Some authors have endeavored to draw reliable distinctions between these two forms of meningitis, stating that in the syphilitic there is little or no fever, and that its course is slower. Our personal experience does not up to the present time enable us to place much value on these distinctions. There is, however, considerable probability that many of the cases which have been reported as tubercular meningitis cured were really of specific origin. I have seen one case which was probably of this character, in which the diagnosis of tubercular meningitis was made and an extremely doubtful prognosis given, but which was followed by a complete recovery.

Chronic forms of leptomeningitis are not rare in hereditary syphilis. They are frequently joined with inflammation of the cortical layers of the brain, and sometimes with that of the dura. How often these forms are primary is doubtful, but it is certain that in acquired syphilis in many cases the symptoms suggest an early involvement, apparently primary, of the meninges. In hereditary syphilis symptoms of this character are much more rare, but we must suppose that in certain cases the infiltration may begin here.

Meningeal hæmorrhage is one of the most frequent and most striking, if not the most frequently noticed of the manifestations of intracranial hereditary syphilis. It is probably largely dependent on the specific endarteritis, but may undoubtedly be secondary to gummata, and perhaps to other syphilitic conditions. It can not always be distinguished clinically from cerebral hæmorrhage, or from the results of embolism or thrombosis, all of which are often due to the same primary conditions.

Affections of the Brain, including the Cerebrum, Cerebellum, Pons, and Medulla.—The affections of the brain are better considered from the point of their pathological causation than from any other. Many of them are undoubtedly the results of the specific endarteritis, which affects both the large and the smaller intracranial blood-vessels, causing not only roughness and inequality in the lumen, and rigidity, circumscribed or diffuse, of their walls, but also producing dilatations or multiple aneurisms in them. These aneurisms are thin-walled and liable to give way, and many intracranial hæmorrhages are undoubtedly thus caused. On the other hand, the rigidity of the vessel walls, which retards the flow of the blood, and the inequalities and irregularities of the internal surface of the vessels, which offer special opportunities for the deposit of fibrin or the stoppage of any body contained in the blood, serve as specially favorable conditions for thrombosis and embolism. As a result of these processes we have cerebral softening, and all the symptoms and conditions consequent thereon.

What part this *endarteritis* plays in fœtal life, and how far it is responsible for cerebral nondevelopment, dating previous to birth, we do not yet know. Nor do we know how far cerebral nondevelopment is dependent on inherited syphilis. The writer freely states that in his opinion cerebral nondevelopment, which antedates birth when not traumatic, is frequently the result of hereditary syphilis; but as yet this is incapable of absolute proof. It is, however, quite certain that a large proportion of the slowly developing nontraumatic conditions which cause impediment or cessation of cerebral development in the infant and young child are either directly or indirectly due to inherited syphilis. Hydrocephalus, in its relation to rachitis, and tuberculosis are, with the exception of certain nontubercular tumors, almost the only other conditions to be considered. The results of specific endarteritis in the brain may be summed up as—1, a gradual diminution in the rapidity of the supply of arterial blood and an inequality in its distribution; 2, thrombosis or embolism, occlusion or partial occlusion of small or large vessels; 3, hæmorrhage, often multiple.

Lesions due to intracranial endarteritis are apt to be multiple, as the endarteritis is itself not localized at a single point.

Other pathological conditions occurring in the brain are diffuse or localized gummatous infiltration. These are on the whole much less common, and rare in acquired syphilis. Gummata of the brain seem to be decidedly rare.

HEREDITARY SYPHILIS OF THE NERVOUS SYSTEM.

BY WILLIAM N. BULLARD, M. D.

HEREDITARY syphilis of the nervous system may affect any portion of this system, or any portions simultaneously. For purposes of convenience we separate the nervous system into three divisions: 1, the contents of the intracranial cavity (the cerebrum, cerebellum, pons, and medulla, with their membranes); 2, the spinal cord and its membranes; and, 3, the peripheral nerves. Portions of any two or of all three of these divisions may be diseased simultaneously or in succession in the same subject. Moreover, although lesions of the nervous system due to hereditary syphilis may occur without the evidence of the present or former existence of lesions due to the same cause in other portions of the body, nevertheless, in the cases which can *with certainty* be classed under this heading, lesions elsewhere have usually been found. This is due in part to the fact that until lately lesions of the nervous system due to hereditary syphilis could not be recognized by themselves, but only when occurring in conjunction with the recognized symptoms of hereditary syphilis in other organs.

In considering these affections from the clinical standpoint we are at once brought face to face with a serious difficulty. A large proportion of these, due indirectly to this cause, show no certain characteristics by which they can be recognized in the autopsy with the means at present at our disposal. Hence many conditions which are probably due to hereditary syphilis can not be absolutely proved to be thus caused, and we can only premise this probability on account of the frequency of their occurrence in connection with other known symptoms of this affection. Many symptoms thus produced are, moreover, similar to those produced by other causes, and have hitherto been commonly referred to other and more readily recognized diseases or affections, as rachitis, scurvy, and marasmus, especially when they are frequently found in connection with the symptom-complexes known under these names. When symptoms of this character occur without any other definite symptoms of hereditary syphilis, and especially if they do not prove amenable to antisyphilitic treatment, we can not without further evidence than we now possess include these cases as syphilitic, however much we may personally be inclined to con-

No view entertained, or at least commonly acted upon by a large number of the medical profession, has acted more strongly as a hindrance both to knowledge and to investigation in regard to the condition, prophylaxis, and cure of idiots and the feeble-minded, than the idea that these conditions (idiocy and feeble-mindedness) can be due to anything else than an organic change, whether nondevelopment, atrophy, or destruction of encephalic tissue, visible or invisible with our present available instruments. In the opinion of the writer, all cases of idiocy and feeble-mindedness are due to organic changes in the central nervous system, caused by disease or injury, whether before, during, or after birth. Whether we can perceive these changes macroscopically or microscopically is of little matter as regards their causation. The primary factor in the consideration of these cases is the premise. *Encephalic nondevelopment is invariably due to disease.* Starting with this as the cases of idiocy and feeble-mindedness within the first year of life which are not due to apparent simple nondevelopment are due to gross lesions, we can say at once that *all cases of idiocy and feeble-mindedness are due to disease.* What portion of these cases is due to hereditary syphilis, directly or indirectly, is still uncertain. From a careful investigation of a considerable number of these patients with a view to determining this question so far as possible, the writer is convinced that many of them are the victims of hereditary syphilis.

In the idiots and the feeble-minded of the class before mentioned we find frequently cranial asymmetries and spastic paralyses, whether hemiplegiæ or paraplegiæ. These, when nontraumatic (produced at birth or otherwise), suggest a causation similar to that producing them later in infancy and childhood.

Patients who become feeble-minded more than one year after birth and under ten years of age are apt to become so as the result of an apparently acute intracranial affection. The weakness of intellect in such cases usually results from a severe meningitis or meningo-encephalitis, or as the effect of an apoplectic shock (hæmorrhage, thrombosis, or embolism). Many of these cases of meningitis, meningo-encephalitis, etc., are due to hereditary specific disease, which thus becomes the indirect cause of the feeble-mindedness. When this condition is accompanied by epileptiform convulsions, as is frequently the case, the mental affection seems to be usually due to the primary disease, of which the convulsions are only the expression. We do, however, also find idiopathic epilepsy, hereditary or not, apparently producing weak-mindedness in children, but it usually takes years to bring this about.

In children we also see feeble-mindedness as a result of hydrocephalus, of tumors, and of cerebral sclerosis. These forms are usually slow in development.

Gradual dementia coming on in childhood, without evident cause, is always suggestive of inherited syphilis. Bury relates several cases, with autopsies. The lesions found were chronic pachymeningitis, chronic leptomeningitis, specific endarteritis, and sclerosis of the encephalon.

Summary.—Congenital idiocy and feeble-mindedness occurring or first noticed within one year of birth are not rarely due to hereditary syphilis. These conditions are the results of disease. Feeble-mindedness in children between the ages of one and two frequently appears to be the result of an acute attack, though in many cases this attack is only the first striking manifestation of a chronic process. These attacks are often due to disease caused by hereditary syphilis. Feeble-mindedness in children may also result from hydrocephalus, from acute meningitis, from trauma, and from other causes which have no connection direct or remote with syphilis in any form. It may thus be caused by nonspecific epilepsy or tumors.

Insanity, except dementia in certain cases, can not be regarded as an ordinary result of hereditary syphilis. It may occur in company with this disease in children as an accidental occurrence, or possibly as the secondary result of some specific lesion, but we know of no accurately reported cases in which this has been proved by autopsy. Epileptic insanity is not included in this statement.

Special mental states—dullness, apathy, confusion of mind, irritability, excitability, want of mental control, want of power of concentration, and lack of moral tone—may occur in inherited syphilis as indirect results of the various lesions caused by it. Hysteria is only caused incidentally, and the same is true of Sydenham's chorea. The organic forms of chorea and athetosis are dependent on encephalic lesions, which may or may not be due to syphilis. In regard to *epilepsy* the same holds good. Idiopathic epilepsy (so called) can not be proved to bear any close relation to congenital syphilis. By idiopathic epilepsy is meant such cases as at the autopsy show no evident pathological causation. Clinically there are many cases in which the existence of an organic lesion is doubtful, and many of the pathological conditions caused by hereditary syphilis produce epileptic convulsions. Hence the existence of epilepsy or of severe and repeated epileptiform convulsions in infancy, if no evident cause be found, should always suggest the existence of hereditary syphilis. Even though after repeated examination no evidence of this can be detected, it is often advisable that a thorough specific treatment should be administered.

Hydrocephalus.—There is positive proof that in many cases hydrocephalus coexists with hereditary syphilis. Probably a larger proportion of cases of hydrocephalus occur in company with hereditary syphilis than can be accounted for by the simple doctrine of accidental concomitance.

Of these cases there is a considerable proportion which are evidently secondary to gross lesions, endarteritis, tumors, etc. If these lesions are due to hereditary syphilis, the hydrocephalus may be considered as likewise due to the syphilis. There are also some cases in which the hydrocephalus seems to be due to an ependymitis of specific origin, and there are again other cases in which the direct source or pathological cause of the hydrocephalus occurring in a hereditarily syphilitic child is not apparent. On the whole, a considerable number of cases of hydrocephalus are found which coincide with hereditary syphilis, and in which this may be considered as in some part a factor. On the other hand, by far the larger portion of cases of hydrocephalus are not, so far as can be proved, in any way connected with hereditary syphilis, but rather with rachitis or various other conditions.

Hydrocephalus is, then, one of those symptoms the presence of which, when no apparent cause for its existence appears, may lead us to suspect the presence of hereditary syphilis as a possible factor, but affords no evidence of its existence. If it be present in a case in which other symptoms suggest the presence of hereditary syphilis, it only adds a slight probability in its favor.

Dizziness, vertigo, headache, nausea, and vomiting, are frequent symptoms in all intracranial affections, and they occur in those due to hereditary syphilis in the same way as when the condition is idiopathic or due to other causes. The violent cephalalgias, however, which are so common in acquired syphilis, appear to be less frequent than we might expect, though they do occur, and are said by Fournier to be common. This apparent rarity may be in part due to the difficulty in estimating the amount of pain in young children, but they seem to be actually less frequent and less severe.

Central Paralyses due to meningeal or encephalic disease are among the most striking and the more frequent symptoms. They are, of course, pathologically secondary to some lesion directly or indirectly due to the constitutional disease. They are frequently the first symptom to call attention to the existence of the trouble. These paralyses may be temporary or more or less permanent. They may affect all the extremities or any one of them; they may be *hemiplegiæ* or *paraplegiæ.* The face may or may not be affected, but is perhaps less likely to be so than in the hemiplegia of adults. There is nothing distinctive in the character of the paralyses, but they observe a precisely similar form to the ordinary intracranial central paralyses due to similar pathological conditions of non-specific origin. In the occurrence, however, of *repeated* cerebral palsies, whether recurrent in the same limb or more particularly when a paralysis occurs suddenly in one or two limbs, to be followed within a few days, weeks, or months by a paralysis of similar central origin in another limb or limbs, we have a condition strongly suggestive of hereditary syphilis (in the infant or child). Multiple central paralyses of the extremities not occurring simultaneously point strongly to hereditary syphilis as a cause. Recurrent paralyses of the same limb suggest hereditary syphilis as a possible cause, but may be due to tubercular meningitis, or tumors which in children are apt to be tubercular, and are of much less significance in a diagnostic point of view. Recurrent paralyses suggest a localized lesion; multiple paralyses either multiple lesions or a diffused lesion.

The above are the principal symptoms, complexes, and groups of symptoms to be met with in hereditary syphilis affecting the encephalon and its membranes. According to the pathological changes we have the corresponding clinical symptoms, which do not differ from those produced by similar pathological changes due to some other cause. Inasmuch as the clinical effect of typical cases of intracranial hereditary syphilis can be better obtained from the description of single patients than from the broader outlines of symptoms, because the latter are so multiform and varied, we shall give a few cases here, not attempting to afford examples of each symptom-group or of each pathological condition:

I. Female, three years old; patient at Children's Hospital. When one year old the record was made in the Surgical Out-Patient Department, "Probable rickets, though the fontanelle is closed; reflexes increased." When eighteen months old had trouble in the right wrist, and about six months ago a similar trouble in the right foot. The affection seems in each case to have been a swelling, accompanied by some loss of use of the affected limb. Previous to the swelling had an eruption all over, not noticed on palms or soles.

Present condition: Remarkably small for age; face pale, haggard. Circumference of cranium, 44 centimetres; circumference of chest, 46·50 centimetres. The median portion of the cranium along each side of the sagittal suture is raised, forming a plateau or ridge running antero-posteriorly, and suggesting the premature closure of this suture. Upper incisors decayed. Gumma on dorsum of right wrist, and another on dorsum of right foot; right knee can not be fully extended on account of pain and resistance; no evidence of rachitis noted about chest.

This case illustrates one of the conditions of the cranium which are found in heredo-syphilitics. Microcephalus is not very rare, but the sagittal ridge is in my experience somewhat unusual, though I have seen several cases.

II. Female. Mother has had five pregnancies: first, stillborn at six months; second and third, alive, healthy; fourth, stillborn at eight months; fifth, patient.

When a week old had jaundice; later, snuffles; and, when very young, inflammation of the eyes. First seen when nine months old; at that time could not sit up alone or use any of its limbs; lets the tongue hang out of its mouth much of the time; makes a sort of moaning noise much of the time, especially when nursing; notices objects. Anterior fontanelle very large; no evidence of rachitis; no enlarged glands. When one year old weighed only twelve and a half pounds; chest circumference was 39·50 to 40·50 centimetres; circumference of head, 41·30 centimetres. No special change in strength; makes noises as above, constantly; lower extremities very small, appear wasted.

When twenty-one months old the child had still no strength, and was incapable of sitting up alone or using any of its extremities. It had lost weight, weighing only ten and a half pounds; still nurses, but regurgitates wind "just like a machine"; anterior fontanelle open; body and limbs extremely emaciated; glands, cervical, post-aural, supra-cubicular, and inguinal, enlarged; all the extremities in a condition of spastic rigidity; rugæ on lips; papular eruption about vulva and anus, and on each labium a thick indurated lump, with a portion of its surface ulcerated. Measurements of head and chest as before. This patient was kindly seen by Dr. Abner Post, and the diagnosis of congenital syphilis confirmed. The brother was examined for evidence of specific trouble, but nothing was detected.

III. Female. When first seen, two and a half years old; father addicted to alcohol; appears to have led a very irregular life, and is now separated from his wife, a very respectable woman, and lives in the West. Mother in fair health; no evidence of any constitutional disease. There are six children, all in good health except the patient, who is the youngest. There was one miscarriage between the fourth and fifth child.

Labor not remarkable; child was well and vigorous until six months ago, when she had a sudden attack of general convulsions, with loss of consciousness, lasting from five to ten minutes. About six weeks later she had another attack similar to the previous one in the beginning, with twitching of the lip, but which did not go on to general convulsions, and in which there was no loss of consciousness. With this occurred a paralysis of the left upper extremity, which has remained permanent. Three days later occurred paralysis of both lower extremities. Since these paralyses there have been loss of speech and diminution of intelligence. The patient was treated by the maternal grandfather, a physician in another city, who prescribed iodide of potassium.

Physical examination showed no malformation or abnormality of development. The head was normal in size and shape; there was no evidence of rachitis; no cicatrices; no enlarged glands; heart and other internal organs normal. There was a spastic paralysis of the left upper and of the right lower extremities, very marked in each case. Nothing definite could be detected in regard to the left lower extremity, which had been previously paralyzed, but it afterward appeared probable that a slight degree of weakness existed in this also.

For the next year and a half the patient gradually improved under electricity, developed well, recovered her previous mental powers, and became able to walk, although she was somewhat lame. The upper extremity also improved, though to a lesser degree than the right lower one. At this time she had measles; after which there was for a time more weakness than previously in the right lower extremity, perhaps due in part to the sudden cessation of the treatment for some weeks. This, however, gradually improved, and returned to its previous condition. Six months later, two years after the patient was first seen, she had a sudden attack of weakness of the left lower extremity, without convulsions or loss of consciousness, which improved spontaneously within a week, but did not wholly disappear. Two weeks after this attack she began to vomit daily, and to appear listless and want to lie in bed. She improved under iodide, but within the next six months had two or three attacks, in which the weakness in the left lower extremity became increased temporarily. She now—two and a half years after first seen—began to lose flesh and strength, and became restless and fretful. Two weeks later she developed the symptoms of an acute meningitis, severe cephalalgia, photophobia, attacks of screaming, with increase of temperature followed by stupor. This illness lasted in the acute stage two weeks, but she eventually recovered, after the attendant physician had given up all hopes, under considerable doses of iodide. She was, however, totally blind, and the specialist by whom her eyes were examined at my request reported (three weeks after acute stage had ceased) that there was beginning optic atrophy, probably following a neuritis. Since then the patient has constantly and steadily improved, and is now, nine months after illness, in good general condition and able to walk well, although totally blind.

I am aware that this case can not be proved to be due to hereditary syphilis, but the evidence in favor of such causation is so strong, that I feel justified in relating it here as a type of a certain class of cases probably due to this disease.

Diagnosis.—The diagnosis of intracranial hereditary syphilis is dependent on several factors. Hitherto it has been made largely from the *history* of the case, the proof or probability of the infection of one or both parents, the occurrence of miscarriages, abortions, or stillbirths in the case of the mother, the occurrence of recognized syphilitic lesions either in the patient or in his brothers or sisters, and from the presence of other lesions due to syphilis at the time of the examination. In other words, up to the present time the diagnosis of inherited syphilis in intracranial disease has been made almost wholly from outside reasons rather than from the character of the disease itself. I think that the time has now come when we are able in many cases to make the diagnosis of hereditary syphilis directly from the intracranial symptoms themselves, while always taking into account any assistance to be obtained from other sources, but no longer absolutely dependent on them. The relative value of symptom-complexes in this regard is very different. The most characteristic form, and one which is strongly suggestive of this affection, is that in which in an infant or young child several attacks of organic paralysis, central in origin, occur at intervals of from days to months without known cause and without marked symptoms of either tumor or tuberculosis. Recurrent attacks in the same limb are less suggestive than attacks in different limbs.

Probably no other single symptom or series of symptoms is so strongly suggestive of inherited intracranial syphilis as this, but there are many others which, when in combination, strengthen and confirm the diagnosis. These have in general been pretty thoroughly discussed under the symptomatology.

There are several symptoms or groups of symptoms which, while not in the least confined to syphilis, should yet turn our attention to it as a possible, if not probable, cause for their existence. The one perhaps most commonly thought of in this relation is epilepsy. Hydrocephalus is another. Meningitis without a cause, especially if not tubercular and not due to otitis, is extremely suspicious. Certain forms of dementia in children are likely to be due to inherited syphilis. Microcephalus, idiocy, and feeble-mindedness suggest syphilis as a possible cause, but probably the large majority of the cases, especially of the two latter, are due to other causes.

As our knowledge is as yet very incomplete as regards the etiology and causation of many of these conditions, and as we have not yet determined how great the influence of inherited syphilis in them really is, the above statements must be regarded as representing only our knowledge or belief at the present moment, and as liable to be modified or changed at any time as further investigations are made and more light shed on this obscure subject.

II. SPINAL LESIONS OF HEREDITARY SYPHILIS.

Diseases of the spinal cord and its membranes in inherited syphilis are rare. Money has reported a case of osteosclerosis of the cranium with thickening of the pia and dura, atrophy and hardening of the cerebral convolutions, and chronic endarteritis of the basal arteries, with thrombus formation in which sclerosis of the pons and spinal cord were also present. The patient was a female, three and a half years old.

Kahler and Pick in 1879, reported a case of sclerosis of the spinal cord in a patient five months old, affected with inherited syphilis. In this case the lateral cerebellar columns were specially affected.

Remak has drawn attention to inherited syphilis as a possible cause of tabes dorsalis; and Rumpf, although he is very doubtful in regard to this, mentions a case of his own in which such a relation seemed possible.

Keyes's case of temporary paraplegia in a heredo-syphilitic may have been due to a variety of causes, but certainly can not have been caused by any organic affection of the cord. The patient, a boy four years old, had complete paraplegia twice, each time lasting one day only. Fournier has reported a case of specific lesion of the spinal vertebræ in a heredo-syphilitic child, in which there was a massive enlargement of several of the dorsal vertebræ forming a prominence. The principal symptom was difficulty in the use of the lower extremities, gradually increasing until the child was unable to walk, on account of paresis of the lower extremities. The swelling rapidly improved under iodides and the paraplegia grew less. The case could not be followed on account of the patient's leaving Paris.

Laschkewitz, as quoted by Fournier, relates a case of specific hyperostosis of the axis and atlas in a heredo-syphilitic girl of thirteen, which caused symptoms of pressure on the cord, paralysis of all the extremities, and diminution of sensibility. She was cured in two months under specific treatment.

III. LESIONS OF PERIPHERAL NERVES IN HEREDITARY SYPHILIS.

Affections of the peripheral nerves other than the cranial are almost unknown. Remak has, as above mentioned, reported certain cases of tabes in young persons in which the peripheral nerves or their roots were probably affected, but the heredo-syphilitic origin of these is not fully established. Ormerod's case of a fusiform tumor of the median nerve has even less evidence of such an origin in its favor, nor do Henoch's cases, as quoted by Post, seem to us satisfactory. These latter were cases of brachial paralysis, which disappeared under specific treatment. In considering these lesions we are, of course, discussing only heredo-syphilitic affections of the nerves themselves, and not neuritis or other affections secondary to gummata or other syphilitic lesions.

Affections of the cranial nerves, on the other hand, though relatively rare in relation to those in acquired syphilis, are sometimes found. Most of the cases in which these troubles occur are those in which the nerve lesion is secondary either to a meningitis or to a brain tumor or hydrocephalus. Optic neuritis and atrophy are produced in heredo-syphilis by the same conditions by which they are produced in nonsyphilitic intracranial affections. Paralyses of the ocular muscles are sometimes found. In Dowse's case of gummata of the brain there was paralysis of the right sixth and the left seventh nerves, and the left eye was remarkably immobile.

Dr. Barlow reports the case of a boy, fifteen months old, in whom evidences of syphilitic infiltration of the cranial nerves were found. Both third nerves were enlarged at their superficial origin into conical tumors, and there was considerable broadening of the fourth, fifth, sixth, seventh, and eighth pairs. In those examined microscopically there was abundant infiltration of new cells, and almost entire atrophy of the nerve cylinders. Von Graefe has also reported a case of gummatous interstitial neuritis and intracranial perineuritis of the third nerve. Clinically, Mackenzie has related an interesting case of double ptosis, with recovery. Hutchinson has described a patient of sixteen with bilateral ophthalmoplegia externa.

Hence, direct infiltration and disease of intracranial nerves may occur. Affections of these nerves secondary to central lesions or meningitis are possibly more common; but affections of these nerves, as a whole, are much rarer in hereditary than in acquired syphilis.

EXPLANATION OF PLATE XXI.

Fig. 1, gummata of the conjunctiva. In the infero-temporal quadrant is a large gumma of the ocular conjunctiva, extending from the lower *cul-de-sac* to the corneal margin, and infiltrating the conjunctiva to such an extent that it overlaps the cornea for some distance. On the temporal margin of the cornea is a small gumma, adjacent to and probably continuous with the large gumma.

Fig. 2, a well-marked example of gumma of the sclera or episcleral tissue on the temporal side of the eyeball; sometimes called scleritis gummosa.

Figs. 3 and 4, double interstitial keratitis, in the last stage of permanent opacity. The acute inflammatory symptoms have all subsided, leaving the deep layers of the cornea occupied by a dense, grayish-white infiltration, the anterior surface being smooth and transparent. (Taken from Jonathan Hutchinson's Treatise on Diseases of the Eye due to Inherited Syphilis, London, 1863.)

Fig. 5, plastic iritis in a syphilitic patient, showing both the conjunctival and ciliary injection, the discoloration and swelling of the iris tissue.

Fig. 6, plastic iritis in a syphilitic patient in the last stage, showing the posterior synechiæ or adhesions between iris and lens, which have not been broken by atropine. The inflammatory symptoms have mainly subsided. (Both these figures [5 and 6] are taken from Juler's Ophthalmic Science and Practice.)

Fig. 7, gumma of the iris, pathognomonic of acquired syphilis. The small yellow nodule on the sphincter margin of the iris in each eye is the gumma. The irides have lost their color and are immovable, and the pupils are irregular in shape, owing to the presence of posterior synechiæ. The deep or ciliary injection is most marked along the superior and inferior margins of the cornea. (By the courtesy of Dr. J. A. Andrews.)

PLATE XXI.

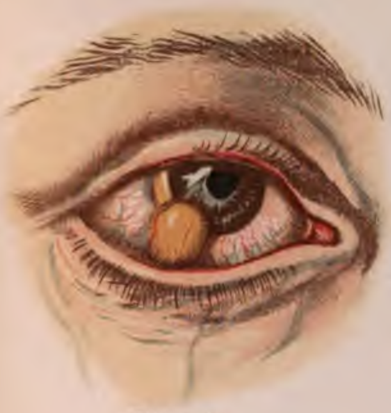


Fig. 1.

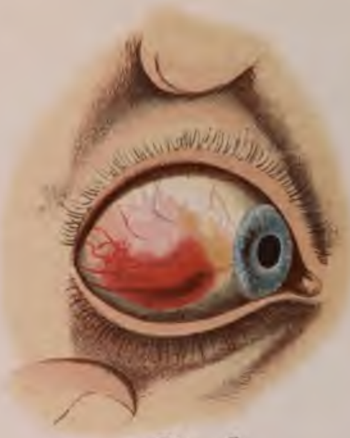


Fig. 2.

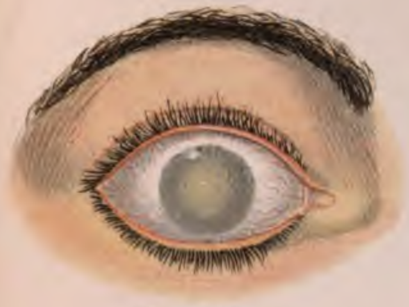


Fig. 3.

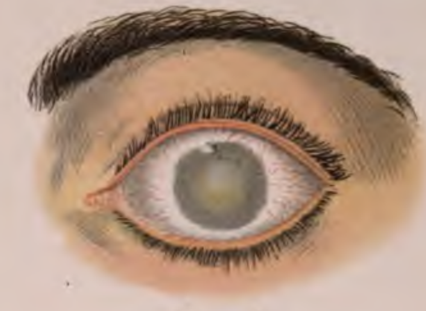


Fig. 4.

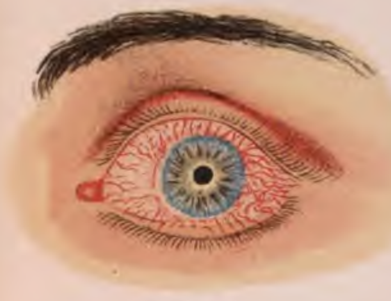


Fig. 5.

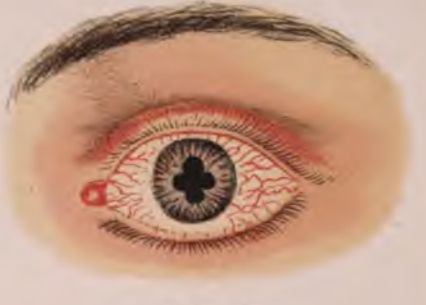


Fig. 6.

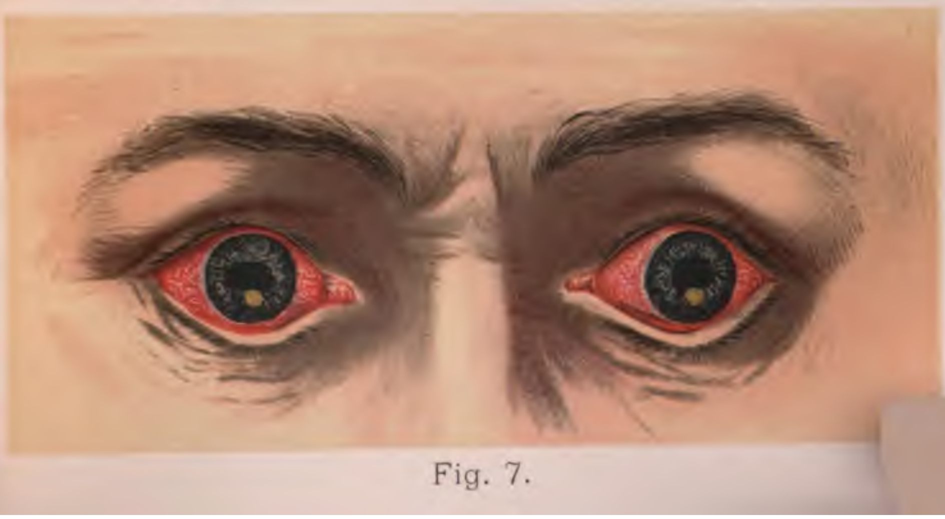


Fig. 7.

SYPHILIS OF THE EYE AND ITS APPENDAGES.

By CHARLES STEDMAN BULL, M. D.

I. SYPHILIS OF THE LACHRYMAL APPARATUS.

Constitutional syphilis, as an independent process, rarely attacks the lachrymal apparatus primarily, but usually extends from some neighboring organ and affects the lachrymal apparatus secondarily. The most frequent source of these secondary affections is the nose, in which syphilitic inflammatory and ulcerative processes are so frequently observed and so often involve the nasal duct. Inflammation and ulceration of the nasal mucous membrane extends by contiguity of tissue to the lining of the nasal duct and thence to the lachrymal sac. This in turn gives rise to deeper lesions of the nasal duct, with the group of symptoms so familiar to every one, of purulent discharge from the sac and duct, stricture of the latter, phlegmonous inflammation of the overlying tissues, and the formation of an abscess, ending in a lachrymal fistula. Finally, caries and necrosis of the nasal process of the superior maxilla take place, and usually permanently distort or obliterate the nasal duct. For greater convenience of reference and easier comprehension, syphilitic diseases of the lachrymal apparatus will be considered under three heads: Lesions of the Lachrymal Gland, Lesions of the Lachrymal Caruncles, and Lesions of the Lachrymal Passages, including Canaliculi, Sac, and Nasal Duct.

I. LESIONS OF THE LACHRYMAL GLAND.

It may be doubted whether syphilis ever affects the lachrymal gland *primarily*, for but few such cases have been reported, and even these are incomplete and unsatisfactory. It is here necessary to bear in mind the importance of distinguishing between two varieties of syphilitic lesions, viz., between those lesions which are met with directly or primarily in the organ in question, and those which occur indirectly or secondarily in the organ as a consequence of lesions in the neighboring parts. Several of the older writers speak in a general way of chronic inflammation of the lachrymal gland—dacryoadenitis—as sometimes due to syphilis, and among these may be mentioned Châlons, Tavignot, Streatfield, Adler, Aldini, and Alexander, all of whom have reported cases of tumors of the lachrymal gland, which, from their symptoms and course, pointed to syphilis as the cause. Alexander's is the latest and most probable case, but even here the gummatous infiltration of the gland may have extended to it from the surrounding connective tissue. The symptoms of a gummatous infiltration of the lachrymal gland would be the presence of a tumor in the upper and outer angle of the orbit, which extends backward into the depth of the orbit and forward beneath the conjunctiva of the upper *cul-de-sac* and upper lid, causing an appearance of ptosis. If the tumor were of considerable size, the eyeball would be displaced downward and inward toward the nose. The tumor would be sensitive to pressure, and if other symptoms of constitutional syphilis were present, the diagnosis of gumma of the lachrymal gland would be made.

It might be conceived that, owing to its situation, the lachrymal gland might become inflamed as a consequence of periostitis of the orbit. The inflammatory process might extend from the periosteum to the fibrous envelope of the lachrymal gland, and thence to the trabeculæ in the interior of the gland. The writer has seen several such cases, in all of which the gland was enlarged and inflamed as a consequence of general inflammation and infiltration of the orbital tissues, spreading from a diffuse orbital periostitis. There was excessive exophthalmos and severe pain. In one of these cases the entire contents of the orbit, including the eye, already partially blind from irido-choroiditis, were removed to relieve the excessive pain. The lachrymal gland was found generally enlarged, the hypertrophy being due partly to increase in the connective-tissue elements of the gland and partly to gummatous infiltration. The patient subsequently died from meningitis and gumma of the dura mater. Unless periostitis be present, there is usually no pain in these cases, except on pressure.

II. LESIONS OF THE LACHRYMAL CARUNCLE.

The caruncle may be affected by syphilis secondarily, as in the extension of a simple conjunctivitis, or of a conjunctival ulceration from a broken-down papule or tubercle. The caruncle may also become inflamed as a consequence of inflammation of the lachrymal sac, and would probbly become involved in cases of caries or necrosis of the lachrymal bone. The first change would be a hypertrophy, which would probably be followed by atrophy, and perhaps by entire disappearance of the caruncle. Gummatous infiltration of the caruncle has been described by Dr. R. W. Taylor, of New York, who has reported two cases. In both cases a swelling appeared at the inner angle of each eye, which proved on examination to be the caruncle enormously enlarged, deep red in color, firm to the touch, and protruding markedly between the edges of the closed lids. In one case these tumors were removed by operation by a surgeon, which was followed by decided deformity. In the other case persistent antisyphilitic treatment caused a reduction of the growth, and eventually atrophy of the caruncle.

III. LESIONS OF THE LACHRYMAL PASSAGES, INCLUDING CANALICULI, SAC, AND NASAL DUCT.

When we come to consider the lachrymal excretory passages, we find that syphilitic lesions are not at all uncommon, especially in the lachrymal sac and nasal duct. These lesions are manifestations both of early and late constitutional syphilis, and are usually accompanied by some other general symptoms.

Beginning with the canaliculi, including the puncta, we find that the form of conjunctivitis so often seen with syphilitic iritis may spread to the tear channels in the lids through the puncta, and soon causes a narrowing or obliteration of the caliber of the canal or punctum, and prevents the drainage of the tears. As a result there is constant epiphora, which keeps the edges of the lids and the external surface of the lower lid constantly irritated. This same inflammation may extend through the canaliculi to the sac and cause a dacryocystitis, though usually inflammation of the sac originates in trouble in the nasal duct, which has spread from the nose. Another lesion of the conjunctiva, or edge of the lid, which may involve the punctum and canaliculus, is a chancre occurring in this locality, which may obliterate the punctum and canal by ulcerative action. Another conjunctival lesion which may involve the canaliculus is a papular or tubercular syphilide, which generally begins on the margin of the lid in this vicinity. These syphilides often break down, ulcerate, and prove destructive to one or both canaliculi.

Inflammation of the conjunctiva and canaliculi may extend to the lachrymal sac and excite a dacryocystitis, which is at first catarrhal, but subsequently becomes purulent. But the course of the disease is usually in the reverse direction from the nose, through the nasal duct into the sac. Moreover, purulent dacryocystitis is not common unless there is present disease of the periosteum of the nasal duct, or caries of the bony canal or lachrymal bone. In some cases the focus of disease may start in a periostitis of the nasal duct, independently of any disease in the nose, as a result of constitutional syphilis, and thence spread to the mucous membrane lining the duct and sac, thus causing the dacryocystitis. This periostitis usually tends to caries of the underlying bone if not promptly treated; but it may be sluggish and chronic in its course, and may be accompanied by the development of a subperiosteal gumma, which would entirely obliterate the caliber of the duct. The occurrence of these gummata in the wall of the nasal duct is not very uncommon. Another source of obstruction in the duct, which acts as an indirect cause of inflammation of the duct and sac, is the occurrence of a mucous patch on the wall of the nose at the mouth of the duct, which closes the orifice.

The obstruction to the course of the tears in their downward flow may occur at any point in the length of the duct, and in syphilitic patients is usually met with at or near the mouth of the duct. It is, however, by no means confined to this spot, but spreads upward toward the sac, so that the stricture may in time nearly equal the duct in length. This stricture, when membranous in character, may remain so to the end, and is amenable to treatment; but if the periosteal lining of the duct be involved in the process, or the bony wall be diseased, the treatment becomes very chronic. In some instances the duct becomes obliterated. Usually, before this stage has been reached, the lachrymal sac has become inflamed, the dacryocystitis has developed into an abscess and opened externally by a fistula just beneath the internal canthal ligament.

Symptomatology of Dacryocystitis and Stricture of the Nasal Duct.—There is first an overflow of tears, more or less marked; then a sense of distention in the neighborhood of the lachrymal sac, followed by a distinct swelling in this region. Pressure with the finger at this point causes an evacuation of glairy mucus or muco-pus through the puncta into the conjunctival *cul-de-sac*. This condition may remain unchanged for an indefinite period, or the inflammation in the sac may become distinctly purulent. Then the overlying connective tissue becomes infiltrated and brawny, the skin becomes adherent, and finally all the tissues ulcerate, the abscess opens externally, and a fistula of the lachrymal sac is the result. This, however, is not common, unless caries be present. The longer the chronic stage lasts in the duct or sac the greater is the probability of the bones becoming diseased. Though ordinarily occurring as a late manifestation of syphilis, the lesions in the nasal duct may be precocious.

Mucous patches are much less frequent in the nose than in the mouth or pharynx, and are usually confined to the inner surface of the alæ of the nose, to the septum nasi, or to the anterior ends of the inferior turbinated bones. They are almost always erosive in their nature, and in the nasal duct they produce more or less destructive inflammation of the periosteum, and extensive caries of the bony walls. The syphilitic disease here attacks the bone in two ways: First, there may be congestion, rapidly followed by a molecular destruction of the bone tissue, or osteitis and caries; this process soon destroys the lachrymal bone and upper end of the nasal process of the superior maxilla. The second process is a pure necrosis, in which the bone becomes more profoundly diseased, and distinct sequestra of varying size are detached, which require operative interference for their removal. This form of bone lesion may be a primary one in the upper jaw, and is the cause of those cases of total obliteration of the nasal duct which are sometimes met with, by the falling together or caving in of its walls, and subsequent adhesion of the bony surfaces by inflammatory action. Another form of lesion which occurs in the nasal duct is an osteo-periostitis gummosa of very rapid development, ending in suppuration. The obstruction of the duct by these gummous growths, developed in its walls, would be very rapid, owing to the incompressibility of its walls and the small size of its caliber.

Another form of syphilitic lesion of the lachrymal passages which is rare, may be described as a hyperplastic process in the bones, which aid in forming these passages, or exostoses and periostoses of the lachrymal bone, and of the bony wall of the nasal duct. These bony outgrowths do not always occur solely in the nasal duct, for they have been met with in the angular apophysis of the frontal bone and in the lachrymal bone. These exostoses ulcerate and become carious, or the bony walls of the duct approach each other, the lining fibro-mucous membrane becomes inflamed, ulcerates, and is destroyed, and in this condition the case is irremediable.

Hyperostosis is a very different process, is never ulcerative in its action, and causes an obliteration of the caliber of the duct, simply by the enormous hyperplasia of bone tissue in the superior maxilla. As a disease process it is not susceptible of treatment.

Treatment.—This varies somewhat, according to the stage of constitutional infection and the severity of the lesion. If the latter be a simple inflammation of the lining of the canaliculi or sac, which has spread from a conjunctivitis which is so commonly associated with syphilitic iritis, nothing is required but a simple, mild astringent lotion locally, and the cautious administration of mercury in some form, externally, internally, or both.

If the inflammatory action is more severe, with secretion of mucus or pus, with a swelling over the seat of the lachrymal sac, and if there is good reason for suspecting a stricture of the duct, do not resort to operative interference until internal medication has been tried faithfully. The use of mercury must here be more prompt and its effect must be more rapidly produced, or the disease may extend from the lining of the canal to the bony walls. If pushed rapidly to toleration limits, a beneficial effect upon the lesion will be observed on the third or fourth day, and then the mercury may be either entirely discontinued, or given in smaller doses at longer intervals. At the same time the application of hot bichloride solutions to the parts involved, and frequent instillations of the same, in the strength of 1 to 5,000, into the conjunctival *cul-de-sac*, are to be persisted in. In many of these cases complete recovery follows such a course of treatment, and the patency of the duct is restored without any incision or probing.

If the case is chronic, and there is reason to suspect the presence of caries of the bony wall of the duct or of the lachrymal bone, the main reliance is to be placed on potassium iodide, which should be given at first in moderate doses and gradually increased up to the limits of toleration; being guided in our action by the severity of the case and the idiosyncrasy of the patient. Even in cases of long standing, with perhaps a fistula of the lachrymal sac and extensive disease of the bones, this treatment, if rationally begun and patiently persevered in, will in many instances effect a cure without the aid of knife or probe. Usually, however, in long-standing fistulæ, the edges of the external opening become indurated and somewhat everted, and in such cases the edges must be freshened and pared, and brought together with one or two sutures, before adhesion of the external lips of the opening occurs.

In some very protracted or virulent cases no treatment, internal or operative, will bring about a good result. These cases are examples of extensive destruction of bone, in which the caliber of the canal has become entirely obliterated by adhesions of the walls of the duct from destructive inflammation and subsequent atrophy of the bone after caries. This usually occurs in the lower third of the canal, but sometimes it is met with near the point of union of sac and duct. The best that can be expected in these cases is to allay the purulent inflammation in the lachrymal sac by slitting up both canaliculi and washing out the sac with astringent and antiseptic solutions. If, in spite of this treatment, the suppurative process still continues and the caries in the lachrymal bone is not extensive, it is better to destroy the sac by the application of nitric acid on a cotton holder, or by the galvano-cautery. If a lachrymal fistula is present, the latter is to be laid open to the sac, the sac must be freely incised, and the cautery applied thoroughly to its entire inner surface. If there is no fistula, the sac may be opened from the side toward the caruncle, inside the internal canthus, by connecting the incised canaliculi by a long vertical incision, and the cautery applied thoroughly to the sac and inner surface of the canaliculi. Free suppuration ensues, and the cavity generally closes in about three weeks. Epiphora remains for some time, but eventually diminishes and may entirely disappear, possibly from compensatory atrophy of the lachrymal gland. If the caries is extensive, all the dead pieces of bone must be carefully and thoroughly removed, and the sac dissected out and removed entire. Free irrigation of the deep cavity thus left, with antiseptic solutions, must then be instituted, and the hole allowed to granulate from the bottom.

II. SYPHILIS OF THE EYELIDS.

In the eyelids we meet with four varieties of syphilitic lesions, viz.: 1, the chancre or initial lesion; 2, papules or tubercles, the so-called tubercular syphilides; 3, rupial ulcerations; 4, gummata. They are all generally met with in the lower lid, along the edge of the lid, and at both canthi. They are rare manifestations of constitutional syphilis.

Chancre.—The initial lesion may occur on the edge of the lid, involving both skin and conjunctiva, or on its inner conjunctival surface, or on its outer skin surface. It presents all the signs of a chancre anywhere else in the body. The original starting point has never been definitely determined, but it is probably caused by inoculation of the virus in the mouths of the excretory ducts of the Meibomian glands. The ulcer then opens out on the lid margin, or on the tarsal conjunctiva near the edge of the lid. It begins usually as a slight swelling or tumor like a pimple, painless, but producing much itching and irritation. The summit next becomes excoriated, the ulcer growing broader and deeper, and soon taking on the characteristic form. The ulcer is rarely deep, but rather saucer-shaped. The edges are not steep or punched out, but are sloping or rounded, slightly raised and irregular or eroded, and the edges are firmly indurated. The floor is moist, and covered with a grayish or dirty-yellow *débris*. The base is very distinctly indurated, and often extends for some distance beyond the area of ulceration. The ulcer may spread widely and become very irregular. The conjunctiva is more or less congested, and there is some muco-purulent discharge. In some cases the lid becomes enormously swollen and tense. If the chancre is at the inner canthus, where it may involve the punctum or canaliculus, the epiphora or watery condition of the eye is marked. Pain is rarely met with. Induration of the neighboring glands is an almost constant symptom, though it may make its appearance very late in the course of the disease.

Etiology.—The two principal modes of contagion are the unclean fingers and the diseased mouth, lips, and tongue. Virus may be conveyed by the patient's own fingers from the genitals of the syphilitic person. The act of kissing is a frequent source of contagion, the virus coming from mucous patches on the lips and tongue.

Diagnosis.—The resemblance of a chancre to a broken-down or ulcerated tertiary syphilide is often misleading. A tertiary ulcer or a broken-down gumma, however, has not the characteristic induration, though it has an infiltrated base. Its edges are sharply cut or punched out, its floor is bathed in pus, and the neighboring glands are rarely indurated. It might be mistaken for a hordeolum or sty, but the latter has an acute course, is painful, its base, though swollen and inflamed, is not indurated, and it heals rapidly after being opened. A chancre might also be mistaken for a suppurating chalazion, but the latter has a narrow, deep opening, with soft edges and no induration. When situated at or near the inner canthus, a chancre has been mistaken for an ulcerated lachrymal abscess, but here the history should enable us to distinguish between them. Rodent ulcer and epithelioma, occurring on the margin of the lid, have some points of resemblance to a chancre, but they occur, as a rule, late in life, and are very chronic in their course. Moreover, the floor of such an ulceration is red and granular, and the ulcer tends to spread, healing as it extends. A chancre may also be confounded with lupus, but the latter is rarely confined to this site, and may be discovered elsewhere on the cutaneous and mucous surfaces.

Course.—A chancre of the lid is somewhat chronic and indolent, remaining inactive for several weeks. It is not very responsive to treatment, and sometimes under injudicious treatment it actually increases in size. After several weeks the ulcer undergoes cicatrization. The induration is very persistent, and may remain for months as a cartilaginous nodule, after the ulcer has healed. The prognosis is favorable, so far as the eyeball is concerned. It rarely leads to any serious loss of substance or distortion of the lid. Local treatment is of little or no avail.

Syphilitic Eruptions.—The exanthematous lesions of the lids are usually of the papular or tubercular variety. A syphilitic eruption very rarely occurs on the conjunctival surface, but it is quite common on the skin surface. The result may be an ulcer, the center of a papule or tubercle breaking down and sloughing. They may occur at any age, and at almost any period of the constitutional infection. They may be confined to the skin, or may involve the entire thickness of the lid. They may extend superficially along the edge of the lid or into the tissues of the lid. Syphilitic papules may be of rapid growth and great size, but they do not extend deeply, and the destructive process is consequently superficial. A tubercular syphilide is, however, more distinctive in its action, and the general infiltration may be so marked that we have practically to deal with a diffuse gumma. It presents the same characteristics as a gumma, and microscopically the two are one. They have no particular shape or arrangement, and they are not symmetrical. The resulting ulcer is generally a deep, punched-out cavity, with uneven edges, irregularly crescentic in shape, and covered with a reddish-gray deposit or a brown crust. Their original site is either in the corium or in the subcutaneous cellular tissue, and they are usually painful on pressure. They may produce deep destruction, contraction, and distortion of the lids. They may disappear by absorption, or they may disintegrate by retrograde metamorphosis. In the latter case the cuticle becomes thinned, ruptures, and an ulcer is formed, which sometimes extends slowly, sometimes rapidly, its edges become undermined, the surrounding areola widens and becomes very dense and of a dusky red hue, and the base is foul, grayish-red, and covered by a discharge. When healing begins, the ulcer assumes a healthier appearance, the areola becomes softer, and finally a cicatrix is formed with a central depression and peripheral pigmentation. The ulcerated tubercular syphilide must be distinguished from lupus and epithelioma. It is not likely to be mistaken for lupus erythematosus, for the latter extends slowly and never suppurates or ulcerates. In lupus vulgaris the nodules are softer and of slow growth. Lupus generally heals with a diffuse white scar. From epithelioma it must be distinguished mainly by the results of constitutional treatment. In the nodular stage, before ulceration has occurred, a tubercular syphilide might be mistaken for acne indurata, and here the history and coexistent symptoms must help us to a decision.

Gummata of the eyelids, when confined to the skin or edge of the lids, are not uncommon. They are characterized by a dense, board-like hardness of a part of the edge of the lid, and the skin of the lid is of a dark-red or reddish-brown color. When nodular in shape and isolated, they are one and the same with a tubercular syphilide. It is only when the infiltration is diffuse that it is necessary to distinguish between them. Here the whole lid is swollen, particularly along the ciliary margin. If it is the upper lid which is involved, the ptosis is more or less complete. The process may be either acute or chronic, and usually other symptoms of syphilis are present, such as glandular enlargements, periosteal inflammation, and nodular growths.

Tarsitis Syphilitica, or gummatous infiltration of the tarsus, is a rare disease, which has been described by Michel, Magawly, C. S. Bull, and others. It is a chronic, indolent infiltration of the tarsus, which does not involve the external skin. This process of infiltration is not, however, always indolent or passive. It is usually accompanied by some little œdema of the conjunctiva and swelling of the rest of the lid. It is almost always in the upper lid, and generally involves the entire lid from inner to outer canthus, though it may be circumscribed. After its disappearance the tarsus is found to have entirely lost its normal resistance. There is no pain, and no secretion from the conjunctiva, and the disease is of slow progress. The tumor is hard, resisting, and solid. The lid can not be everted. The swelling is homogeneous throughout, and, though starting in the tarsus, generally involves the other tissues of the lid, with the exception of the skin and perhaps also the conjunctiva. After the dense infiltration has somewhat subsided under appropriate treatment, so that the lid may be everted, there may be seen in various places under the conjunctiva a brawny, yellowish-white infiltration of the tissues, which slowly subsides. The cure is probably never a complete one; for, after the absorption of so extensive and dense an infiltration, more or less deformity of the tarsus must and does result, from compression or softening of the tarsal tissue.

III. SYPHILIS OF THE CONJUNCTIVA.

Syphilitic lesions of the conjunctiva, existing independently, and not connected with lesions of the eyelids on the one hand or of the eyeball on the other, are not common. The connection between the palpebral conjunctiva and the other structures of the eyelids is so intricate that syphilitic infiltration of the lid, be it circumscribed or diffuse, soon involves the mucous membrane also. The same may be said, in a modified sense, of the connective tissue between the ocular conjunctiva and the underlying fibrous capsule of the eyeball.

Conjunctivitis.—In syphilitic patients we not infrequently meet with an obstinate conjunctival inflammation of the catarrhal type, but with little or no secretion, and yet there is no positive evidence that the conjunctivitis is caused by syphilis. This is especially noticeable in cases of obstinate iritis.

As a matter of clinical experience, it may be stated that the syphilitic lesions of the conjunctiva are of three varieties, viz.: 1. Eruptions or exanthemata. 2. Ulcerations. 3. Infiltrations. Under the head of ulcerations are to be considered the chancre or initial lesion, and secondary ulcers resulting from the disintegration and breaking down of infiltrated masses. All modern authorities agree in recognizing the occurrence of the initial lesion upon the conjunctiva, as well as gummatous infiltrations and secondary ulcerations.

Chancre.—The initial lesion is rarely met with on the eyelids, and is a still more rare occurrence on the conjunctival surface alone. In most of the reported cases the ulcer has been on the margin of the lids, where cutaneous and mucous surfaces meet. But the author of this chapter has published a case of chancre which was confined to the conjunctiva and pursued an unusual course, and the history of this case is as follows: The patient was a young man, aged twenty-nine, who had never had any other symptom of venereal disease. The mode of origin of the ulcer was unknown, as there was no history of any contamination. The lower lid became somewhat inflamed, swollen, and painful about a week before he presented himself for treatment, and there was a slight muco-purulent discharge. On everting the lower lid, deep in the *cul-de-sac*, about a quarter of an inch from the external canthus, was an ulcerated surface covered by a grayish, pultaceous matter, with hard base, the induration extending for some distance on every side. The ulcer was an irregular oval, half an inch across in its longest diameter, and extended upward into the ocular conjunctiva, which was very much thickened. The whole conjunctiva, both ocular and palpebral, was intensely congested. The pre-auricular gland of the corresponding side was enlarged and tender, and later the same symptoms appeared in the parotid and submaxillary glands. The ulcer was cauterized, and the patient was at once placed on antisyphilitic treatment. The sore healed in about three weeks, and the engorgement of the glands gradually subsided. Nine weeks after the appearance of the ulcer an eruption, roseolar in character, appeared on the face and hands and soon became general. Some weeks later several mucous patches appeared on the buccal mucous membrane and side of the tongue. The patient subsequently suffered from iritis in one eye.

There seems little doubt that either the ciliary margin of the lids, or the *cul-de-sac* between lids and eyeball, are the parts most frequently affected by the chancre. There are some rare cases reported where the lesion was in the ocular conjunctiva at the edge of the cornea, but the diagnosis needs confirmation, and they may have been ulcerated gummatous deposits, or even nonspecific ulcers.

Secondary Lesions.—These lesions, occurring during the period of constitutional infection, are much more frequent than the initial lesion. They may be of the nature of eruptions, appearing as small, circumscribed, elevated, nonvascular spots, of a reddish-gray or coppery color, not differing much from certain eruptions on the skin, with which they may coexist. These *papules* or *pustules* may appear singly, in which case they are apt to be of some size; or there may be several of them, which occasionally show a tendency to coalesce. Where they are multiple they are of small size.

Mucous Patches on the conjunctiva resemble absolutely the mucous patches met with in the mouth or on the lips. They may ulcerate, and then appear as shallow, irregular sores or ulcers, with a tawny surface and ill-defined base. They usually respond readily to treatment.

Ulcers.—Though ulcerations of the conjunctiva generally occur with other syphilitic ulcerations on different parts of the body, yet they usually result from the disintegration of gummatous infiltrations, and not from mucous patches. In isolated cases the process begins with infiltration of a portion of the conjunctiva, which may be distinctly circumscribed or more or less diffuse, but quickly ulcerates, and is easily distinguished from the surrounding tissue by its fatty-looking coating, irregularly eroded edges, and uneven base. If properly treated, these ulcers generally cicatrize rapidly, and if they are situated on the edge of the lid they appear as a tendinous white cord, which extends through the entire thickness of the edge of the lid, and, in consequence of its great shrinkage, eventually forms an excavation in the lid. The isolated occurrence of these superficial ulcers of the conjunctiva is symptomatic of constitutional syphilis.

Gummata.—True *gumma* of the *conjunctiva* is probably the least common of all syphilitic lesions. It is certainly a rare and always a late lesion of constitutional syphilis. It may be either circumscribed or diffuse. Late manifestations of syphilis are rarely limited to the conjunctiva, but usually begin in other tissues and involve the mucous membrane by contiguity of structure. A gumma sometimes appears as a small, discrete tumor in the conjunctiva, varying in size from a pea to a bean, semiglobular in shape, with white or yellowish summit and red base. Under the microscope such a growth is found to consist of a mass of young cells lying in a granular matrix. These gummata sometimes disintegrate and ulcerate rapidly, and are then accompanied by a slight diffuse œdema of the conjunctiva. They are usually met with in the palpebral conjunctiva, or in the *cul-de-sac*, but a few cases have been reported where they appeared in the ocular conjunctiva, immediately around the cornea (Plate XXI, Fig. 1). They are here moderately hard to the touch, and are but slightly vascularized. This is a more dangerous location for them than in the *cul-de-sac*, for if several appear in this locality they may coalesce and form a zone of dense infiltration around the margin of the cornea, interfere with its nutrition by pressure on the lymphatics, and thus lead to necrosis of the cornea and destruction of vision.

IV. SYPHILIS OF THE CORNEA.

Until a comparatively recent period it was not generally believed that acquired syphilis ever affected the cornea. But it is now admitted by many authorities that, in the late periods of constitutional syphilis, lesions may appear in the cornea, which only yield to energetic antisyphilitic treatment; and these corneal lesions may perhaps be classified in the following way: 1. Diffuse parenchymatous or interstitial keratitis, which may involve either the center or the periphery of the cornea, or may assume a triangular shape, and which is always accompanied by malignant iritis. 2. The true keratitis punctata of Mauthner, or the keratitis interstitiales punctiformis specifica of Hock, in which numerous punctate spots of infiltration appear in the parenchyma of an otherwise transparent cornea, without iritis. 3. Keratitis punctata, in which the punctate deposits are accompanied by a generally cloudy cornea, and by iritis. 4. Gummatous degeneration of the cornea.

Alexander claims to have met with corneal lesions in 5·48 per cent of syphilitic diseases of the eye which he has observed.

Interstitial Keratitis.—The best known and most frequently met with lesion is the *diffuse parenchymatous* or *interstitial keratitis*, which is far more frequently the result of inherited than of acquired syphilis. The *acquired form* is characterized by a cloudy opacity situated in the deeper layers of the cornea, which does not present a general homogeneous, gray appearance, but rather consists of a number of irregularly outlined gray or yellowish-gray spots of varying intensity, more or less closely connected together, which are more readily recognized by oblique illumination than by ordinary illumination. The opacity usually first appears at the center of the cornea and extends thence toward the periphery, obscuring the iris. More rarely, it begins at the margin and extends toward the center. The anterior epithelial layer and Bowman's membrane appear stippled, while the membrane of Descemet appears unchanged. In this cloudy parenchyma vessels may be seen to enter at different depths, sometimes few, sometimes many in number; sometimes confined to the marginal zone, sometimes extending to the center. The deep ciliary injection, on the other hand, is generally absent or but little developed. The usual subjective symptoms of corneal inflammation, such as photophobia and lachrymation, are but slightly marked, unless the iris becomes involved. Leber, Jakolewna, Mauthner, and others have all seen and described it, usually in connection with some other syphilitic ocular lesion, and Alexander has reported thirteen cases. The process is always slow, lasting not only weeks, but months, and even years, but without any very unfavorable prognosis. It never ulcerates, though it may produce a permanent alteration in the corneal curvature.

The *second* variety of diffuse syphilitic keratitis is characterized by the opacity beginning at the periphery and extending toward the center, giving to the cornea the appearance of ground glass. The line of demarcation between the infiltration and the clear cornea is rounded and diffuse. The epithelium is intact and brilliant, and there are no vessels visible. Hock, Demarbaix, and Sturgis have also described similar cases, always in combination with iritis.

Keratitis Punctata.—Another variety of syphilitic parenchymatous keratitis is the true keratitis punctata, as described by Mauthner and Hock, characterized by the deposit of circumscribed gray spots, as large as a pin's head, in the corneal parenchyma. There are no blood-vessels visible, and the intervening corneal tissue is transparent and apparently normal. These spots may appear rapidly and as rapidly disappear, and they never suppurate or ulcerate. The iris seems never to be involved in the inflammatory process.

This appearance is entirely distinct from the old disease, formerly incorrectly called "keratitis punctata," which consists of punctate deposits on the endothelium of the cornea, the product of serous iritis. All these varieties of parenchymatous keratitis belong to the late period of constitutional syphilis. They are all very chronic, but yield to persistent treatment, and end by disappearing gradually and entirely. In addition to the general constitutional treatment, the local treatment consists in the application of hot fomentations for fifteen or twenty minutes on the closed lids every few hours, the instillation of a solution of atropia, and leeches to the temple if there is much pain.

Gummatous Infiltration.—A fourth form of syphilitic lesion of the cornea is a gummatous infiltration, beginning at the periphery and extending a varying distance into the parenchyma, and resembling a syphilitic tubercle. Denarié, Watson, and Magni have all reported cases of this nature, but Magni's case was not strictly one of corneal gumma, as the growth began in the conjunctiva and involved the cornea secondarily.

V. SYPHILIS OF THE SCLEROTIC.

Syphilitic lesions of the sclerotic, originating in this fibrous membranè, and distinct from processes involving the other coats of the eyeball, are tolerably rare. It was formerly supposed that the scleritis was always accompanied by iritis, or cyclitis. Mooren was probably the first to describe a syphilitic episcleritis, in 1867, but he was soon followed by Galezowski and Higgens. To the end of more accurate diagnosis, syphilitic processes in the sclerotic may conveniently be divided into three classes, viz.: 1. Episcleritis, or superficial scleritis. 2. Scleritis parenchymatosa. 3. Scleritis gummosa, or gummous nodule of the sclerotic.

The first two classes may be both circumscribed and diffuse, and differ from each other mainly in severity and extent.

1. **Episcleritis,** or superficial scleritis, is the name given to one or more patches of deep congestion on the eyeball, of varying size, accompanied by more or less thickening of the superficial layers of the sclerotic and perhaps of the episcleral connective tissue, and a corresponding elevation of the conjunctiva over the affected spots. The vascular injection is peculiar in character, deep red or almost purple in color, and looking more like a blotch or splash than a mass of distinct blood-vessels. There may be more than one of these patches, but they never involve the entire circumference of the sclerotic. This injection is very deep, and is always accompanied by a conjunctival injection, which masks more or less completely the limits of the scleral injection. This is a comparatively rare disease, and is much more often due to rheumatism or gout than to syphilis. The patches of injection and infiltration may occur at any part of the sclerotic, but are usually in the vicinity of the ciliary region, though they may extend back beyond the equatorial region of the eyeball. The elevation is generally slight, and the pain limited to a dull ache. Iritis may be present, but this is not common. The disease is chronic and sometimes lasts for months, fresh patches springing up

even while the old ones are being absorbed. If the process be a true, superficial scleritis, the disease subsides without leaving much permanent discoloration of the tissue.

2. **Scleritis Parenchymatosa** is simply a more severe type of the same disease, and involves the deeper layers of the sclerotic. Here also the patches are usually circumscribed, though there may be several of them. The injection is deeper in color, the infiltration is more extensive, and in consequence the conjunctiva is more prominently elevated by reason of the greater exudation. There is always a sense of pressure in the eye, accompanied by dull aching, and in some cases severe pain of a boring character. The infiltration is interstitial, and the process may be complicated by iritis or cyclitis, though this is rare. The disease is very chronic; may run its entire course without any accompanying lesion in any part of the uveal tract, and rarely, if ever, ends in suppuration and ulceration. It always leaves behind it a bluish or bluish-brown discoloration, of which it is by no means easy to say whether the discoloration is caused by pathological staining of the tissue, or is due to the pigment of the ciliary body and chorioid showing through a thinned and atrophied sclerotic. In some cases of great chronicity the sclerotic becomes very much thinned from atrophy and absorption of its tissue, and this allows the chorioidal pigment to become visible, and also favors the development of ciliary and equatorial staphylomata.

3. **Scleritis Gummosa, or Gumma of the Sclerotic,** is a purely localized infiltration into and upon the sclerotic, distinctly circumscribed, but with somewhat diffuse margins. The infiltration here is so extensive and so definitely limited that the projection above the surrounding surface is very marked, and the growth, though flattened, sometimes attains a large size, measuring in some instances from two to two and a half centimetres in their long diameter, and from a quarter to half a centimetre in height (Plate XXI, Fig. 2). Cases of scleral gummata have been reported by Hirschberg, Barbar, C. S. Bull, Loring, Sturgis, Alexander, Andrews, and others. The course of the infiltration is usually from within outward, though it may be the reverse. These gummatous deposits usually occur in the course of the straight muscles of the eye, and are more frequent on the temporal side of the eye than elsewhere. This has led some observers to think that in these cases the infiltration starts from the sheath of the tendon or from the capsule of Tenon. They are moderately hard, slightly nodulated, sensitive to the touch, and apparently highly vascularized. The conjunctiva is usually movable over the growth, and the conjunctival vessels are enormously engorged and very tortuous. In addition to the pain there is usually some photophobia and some stiffness in the motions of the eyeball, though no very decided limitation of motility.

Treatment.—Hot applications seem to be of no use in lesions of the sclerotic. Locally a solution of atropia and cocaine should be used if there is any pain, a few drops being instilled every two or three hours as an anodyne and contractor of the caliber of the vessels. If no pain is complained of and no iritis is present, a solution of cocaine (four grains) and of pilocarpine (four grains) should be employed. Remembering the extreme chronicity of these scleral lesions, the constitutional treatment should be persisted in to the end, the potassium iodide being given in constantly increasing doses until toleration is reached, at times together with mercurials and at times alone.

VI. SYPHILIS OF THE UVEAL TRACT, OR IRIS, CILIARY BODY, AND CHOROID.

Constitutional syphilis may affect the entire uveal tract, iris, ciliary body, and choroid, in one eye alone or in both eyes simultaneously; or it may involve the iris or choroid alone, the rest of the vascular or pigmented coat of the eye remaining intact. It is very doubtful whether the ciliary body is ever alone affected, owing to its situation between the iris and the choroid and its close union with the sclerotic. Any lesion of the uveal tract is of serious import, and the prognosis is always more or less unfavorable, because of the great danger of interference with the function of vision.

I. SYPHILIS OF THE IRIS.

One of the most frequent symptoms of constitutional syphilis, and by far the most frequent complication on the side of the eye, is iritis. As a rule, only one eye is at first attacked, though the other eye may and usually does become soon affected. In some cases both eyes are simultaneously involved. Men seem to be more subject to iritis than women. It is, in the great majority of instances, an early lesion of constitutional syphilis, sometimes occurring during the existence of the initial lesion, or chancre, though in rare cases it may be met with as a late manifestation of disease. The attack may be acute, subacute, and chronic, though the latter is very rare.

Iritis, occurring in the course of constitutional syphilis, may be of three kinds, viz., plastic, serous, and gummatous. The first two varieties do not differ at all in their subjective and objective symptoms from iritis due to other causes, and are not pathognomonic of syphilis. The sole variety of iritis absolutely indicative of syphilis is the iritis gummosa, or gumma of the iris, and to this variety alone should the term "syphilitic iritis" be applied.

Symptoms.—Plastic iritis is marked by the following symptoms: 1. The presence of the deep ciliary injection, forming a zone of short, deep, straight vessels immediately around the corneal margin; this may or may not be accompanied by an injection of the conjunctival vessels, which are superficial, long, and tortuous, running from the *cul-de-sac* toward the margin of the cornea. 2. Slight turbidity of the aqueous humor. 3. Swelling and discoloration of the iris, sometimes confined to the region of the sphincter iridis, and sometimes involving the whole iris. 4. Marked sluggishness of the iris, due to infiltration of its stroma; or absolute immobility of the iris, due to the existence of adhesions or posterior synechiæ between the iris and the capsule of the lens. 5. Irregularity in the shape of the pupil, due to the presence of one or more posterior synechiæ. 6. Exudation in the field of the pupil attached to the sphincter margin of the iris or to the capsule of the lens, and coming from the posterior surface of the iris. 7. Photophobia, or intolerance of light. 8. Lachrymation. 9. Disturbance of vision. 10. Pain. 11. Increased tension of the eyeball (Plate XXI, Figs. 5 and 6). All these symptoms may be present in any given case, particularly if it be severe, though some of them are frequently absent. Pain is generally present, and sometimes it is very severe. The ciliary injection, discoloration, and sluggishness of the iris, irregularity of the pupil, and disturbance of vision, are always present.

Serous Iritis.—In this form the aqueous humor is always turbid, the iris is discolored and sluggish, the ciliary injection present, and there is a deposit on the endothelial cells of the membrane of Descemet on the posterior surface of the cornea. The intraocular tension may be increased. The symptoms in this form of iritis are usually less strongly marked than in the plastic form, but they are apt to be more chronic in character. Serous iritis is also more apt to be accompanied by cystitis or choroiditis of a similar serous character, and may thus give rise to the group of symptoms forming the disease known as glaucoma.

Iritis Gummosa.—The only form of iritis pathognomonic of acquired syphilis is the *iritis gummosa*. Here, in addition to some or all of the symptoms above mentioned, there may be seen in or on the iris one or more distinct nodular elevations, yellowish or yellowish-red in color, varying in size from a hemp seed to a small pea, situated at the pupillary margin, or ciliary border, or between the two, and showing a tendency to coalesce (Plate XXI, Fig. 7). They may appear distinctly vascularized. This form of iritis has been called by Alexander "iritis papulosa," and this author confines the term "gumma of the iris" to that form in which the nodule is solitary, always at the ciliary margin, of the size of a pea or larger, and tending to involve the ciliary body. He says that such a gumma disappears by fatty metamorphosis, leaving a permanent scar and producing atrophy of the iris tissue. He thinks that iritis papulosa may occur at a comparatively early period of constitutional syphilis, while the true gumma of the iris is always a late lesion, and is not very common.

Prognosis.—This is fairly good in the plastic and serous forms of inflammation, but doubtful in the gummatous form, owing to the tendency of the lesion to involve the ciliary body and induce atrophy of the eyeball, and to the generally cachectic state of the patient. The danger in the plastic variety, particularly if the patient is not seen early enough, is the blocking of the pupillary space by masses of exudation, and the formation of numerous broad, firm, posterior synechiæ, both of which conditions cause marked diminution of vision and even its entire suppression, and, by closing the channel of communication between anterior and posterior chambers, tend to develop the condition of glaucoma.

The danger in the serous form of iritis is the possibility of its extending to the ciliary body and choroid, thus setting up a serous inflammation of the whole uveal tract and ending in glaucoma.

Treatment.—In all forms of iritis the treatment should be both local and constitutional. In all three forms of inflammation the local remedies should consist in frequently repeated applications of hot water to the closed lids, and to the more or less frequent instillation of a solution of atropia. If adhesions between iris and capsule of the lens have already formed, atropia must be instilled frequently. If the pain is very severe, relief is frequently afforded by leeches to the temple. If opiates are really required, a strong solution of atropia, even as high as a four-per-cent solution, must be instilled, to counteract the effect of opium in contracting the iris. If we succeed in breaking the adhesions by atropia, the battle is half gained. The internal or constitutional treatment should consist, of course, in the administration of mercurials and potassium iodide. In the iritis gummosa it is very important to bring the patient as rapidly as possible under the influence of mercury and potash. The latter may be pushed to toleration, but the mercury should always be administered in combination with ferruginous tonics and dilute hydrochloric acid. It is sometimes important to administer the mercury externally in the form of ointment. Hot water and atropia should of course be applied locally.

Very often cases of iritis, particularly the plastic type, end in permanent adhesions between the iris and the lens. These require subsequently operative interference, the object being twofold: First, because the continued presence of these synechiæ are a constant source of irritation, which may tend to cause a relapse of iritis; and, secondly, because they may engender the glaucomatous condition. This latter danger may be regarded as always present, if the adhesions are continuous all around the sphincter margin of the iris. The operation indicated here is what is known as iridectomy, and consists in removing a segment of the iris, from ciliary margin to sphincter, of varying width, according to the number and breadth of the adhesions present.

II. SYPHILIS OF THE CILIARY BODY.

Cyclitis.—Inflammation of the ciliary body, like iritis, may be plastic, serous, or gummatous in character. It is a grave disease, and tends naturally to destruction of the eye. Its prognosis is always unfavorable, especially in the gummatous form of the disease. It is markedly chronic in its course, and, contrary to what generally prevails in iritis, the intra-ocular tension is usually diminished. The most marked symptoms are severe pain, and extraordinary sensitiveness to pressure on the eyeball.

Diagnosis and Symptoms.—The symptoms of *plastic cyclitis* are usually ciliary injection, severe pain, diminished tension, more or less marked disturbance of vision, usually due to exudation into the vitreous humor, and a plastic exudation into the posterior chamber, between the posterior surface of the iris and the suspensory ligament and anterior capsule of the lens. The ciliary injection may not be very marked. As a distinct disease, without a similar inflammatory process in either iris or choroid, it is of rare occurrence, and many authors deny its existence, claiming that the iris and choroid are always involved, and that the disease is really an irido-choroiditis. As a matter of clinical observation, in almost all cases we find a turbid aqueous humor, punctate deposits on the membrane of Descemet, a deep, anterior chamber from apparent retraction of the iris, flocculi in the anterior part of the vitreous humor, with patches of choroiditis. In plastic cyclitis we look for a diminished tension, but in serous cyclitis the tension may be slightly elevated at first. It may subsequently become normal and remain so, or the eye may take on a permanent condition of increased tension. It is very difficult to distinguish between what is a plastic and what is a serous cyclitis, but the former is usually accompanied by iritis, the pupil becomes blocked by exudation, the posterior chamber becomes filled by a similar exudation, and the iris protrudes toward the cornea at the periphery, while the sphincter of the iris seems to be drawn backward, being firmly adherent to the capsule of the lens. A glaucomatous condition then results, as the posterior synechiæ are very tough and firm, and can not be made to yield to any procedure short of the knife. In serous irido-cyclitis, while the adhesions of the iris to the lens are usually very firm, causing what is known as seclusion of the pupil, the exudation behind the iris is more apt to be fluid, but the same glaucomatous condition is apt to arise, particularly if the choroid has become so far involved in the serous inflammation that the posterior lymphatic channels in and around the sheath of the optic nerve have become obliterated.

Cyclitis Gummosa.—The gumma may originate in the iris and extend to the ciliary body, or it may originate in the ciliary body itself. In the latter case it has a strong tendency to extend to the sclerotic, and may also involve the iris. The intra-ocular tension is apt to be diminished in these cases, and in bad cases the eye becomes very soft. Occasionally, when the iris is not involved, or the pupil has become widely dilated by atropia, the gumma may be seen within the eye by examination with the ophthalmoscope. In pronounced cases there is sometimes a distinct external projection in the ciliary region simulating a staphyloma, but from this it must be carefully differentiated.

In any form of cyclitis the prognosis is always unfavorable, and it should not be forgotten that the disease, in the serous form at least, tends to the development of the glaucomatous condition; while in the gummatous form the tendency is always to atrophy of the ciliary body and shrinking of the eyeball or phthisis bulbi.

III. SYPHILIS OF THE CHORIOID.

Next to the iris, the chorioid is the most frequent seat of syphilis in the eye. Syphilitic chorioiditis may be divided into two classes: that which affects the anterior segment of the chorioid, and which is usually connected with inflammation of the ciliary body and iris; and that which is more or less closely confined to the posterior segment of the chorioid and rarely spreads beyond the equator of the eyeball. No form of chorioiditis is strictly pathognomonic of syphilis, and the diagnosis must rest upon the history of the case.

In chorioiditis anterior, or irido-chorioiditis, a disease of a severe type, the symptoms are a sudden diminution of the vision, in consequence of severe preceding iritis, boring pain in the eye, dense opacities of the vitreous which obscure the fundus, sudden diminution of intra-ocular tension, followed later by as sudden an increase in the tension, photopsic manifestations of various kinds, and finally the formation of cataract, and possibly of staphyloma of the ciliary and equatorial regions. In the worst cases the results are destruction of all the coats of the eye, atrophy of the iris and ciliary body, shrinking of the vitreous, and detachment of the vitreous or retina.

Another form of *chorioiditis anterior* is the serous variety, characterized by more or less extensive opacities of the vitreous in its anterior portion, which are sometimes so dense that vision is reduced to perception of light. It may be preceded or followed by a serous iritis. The tension is apt to be abnormally increased and the pain severe. If taken in time the prognosis of these cases is favorable, if the administration of mercury is pushed to extreme toleration.

The so-called *chorioiditis posterior*, met with in syphilitic patients, is an exudative chorioiditis appearing under various forms, to which collectively it would be better to apply the term chorio-retinitis, since the retina is almost always involved in the process. Various authors have at different times recognized and described three different forms of syphilitic chorioiditis, viz.: 1. Smooth, reddish or yellowish patches appearing at the periphery of the fundus, which soon assume an atrophic aspect and are surrounded by a zone of pigment (Plate XXII, Fig. 1). 2. Larger, slightly elevated, sharply defined, whitish or yellowish patches, situated near the posterior pole of the eye, around the optic disk and macula lutea, accompanied by marked disturbance of vision (Plate XXII, Fig. 2). 3. A form of chorioiditis characterized by similar patches in the posterior segment of the chorioid, of rather rapid growth, with a tendency to coalesce, and accompanied by fine, fixed, dustlike opacities in the vitreous, and some floating opacities, with very marked and sudden diminution of vision. In all three varieties there is a constant tendency to the heaping up of masses of pigment around the patches of exudation.

Diagnosis.—It is by no means easy to sharply differentiate these different varieties of inflammation. The chorioiditis disseminata of the first two varieties may appear simultaneously with the third or diffuse chorioiditis. As a result of this, a very extensive atrophy of the superficial pigment is sometimes met with; while in other cases the pigment seems to be increased in quantity and rolled togther in great masses, making a very striking ophthalmoscopic picture. To this form the name of chorioiditis disseminata pigmentosa has been given.

Symptoms.—In all the forms of chorioidal inflammation, opacity of the vitreous is a common symptom. It is sometimes diffuse and dustlike in character, but more frequently it consists of cobweblike structures or dense membranous formations. The latter are more often found in the posterior parts of the vitreous, while the dustlike opacities occupy the anterior portion of the vitreous. They are sometimes fixed and sometimes floating, the cobwebs and membranes appearing black against the general red background.

The course of chorioiditis is always ominous, unless recognized early and promptly neutralized by active treatment, though the prognosis is probably more favorable in the syphilitic form of the disease than in chorioiditis due to other causes. The gravity of the disease is due to the frequent complication with retinitis, and to the tendency to inflammation and atrophy of the optic nerve, induced by the chronic and persistent character of the disease. The larger the patches of exudation, and the nearer they approach to the region of the macula lutea, the more they permanently endanger central vision, and hence the more unfavorable the prognosis. The moment the region of the macula is involved a central scotoma appears in the field of vision. In the more peripheral forms of the disease the vision is not much affected, except by the presence of the vitreous opacities.

Gummatous deposits are rarely, almost never, met with in the chorioid.

Occasionally a severe case of gumma of the ciliary body may extend anteriorly into the iris and posteriorly into the chorioid, but even here it is only the periphery of the chorioid that becomes involved.

Treatment.—The treatment consists in the local instillation of atropia to paralyze the ciliary muscle, the occasional application of a leech to the temple, and the wearing of smoked glasses. Mercurial inunction should be employed freely, and mercury should be given in some form internally. If the optic nerve becomes affected, the local abstraction of blood is contraindicated, and strychnine should be administered either hypodermically or by the mouth.

IV. SYPHILIS OF THE CRYSTALLINE LENS.

Syphilis never attacks the lens primarily or independently. Opacities of the lens itself, and of the capsule, as well as capsulitis, always result from interference with its nutrition, and are only met with as consequences of inflammation of the uveal tract.

V. SYPHILIS OF THE VITREOUS HUMOR.

Hyalitis, or inflammation of the vitreous humor, never occurs primarily as a symptom of constitutional syphilis, but is always due to inflammation of the uveal tract, especially chorioiditis.

VII. SYPHILIS OF THE RETINA AND OPTIC NERVE.

I. SYPHILIS OF THE RETINA.

Syphilitic inflammation of the retina may be divided into five varieties, as follows, in the order of frequency: 1. *Chorio-Retinitis*, in which the retina becomes involved secondarily in consequence of the various forms of syphilitic chorioiditis. 2. *Simple Retinitis*, in which the optic papilla and central parts of the retina are obscured by a faint, mistlike opacity, while the periphery of the fundus is intact. 3. *Retinitis* with *exudation* along the retinal vessels. 4. *Retinitis* with *hæmorrhages*, in consequence of disease of the blood-vessels and the formation of thrombi. 5. The *Central Recurrent Retinitis* of Von Graefe.

1. **Chorio-Retinitis.**—The retinitis occurring as a consequence of chorioiditis, and forming the disease known as *chorio-retinitis*, is characterized by fine dust-like opacities in the vitreous humor, a general indistinctness of the fundus caused apparently by a delicate membrane or veil drawn over the disk and neighboring portions of the retina, behind which, however, the outline of the optic disk may be clearly defined. All this is due to an infiltration of the vitreous, which is at times difficult to recognize, and always signifies that the chorioid is involved. As the case progresses other signs of choroiditis make their appearance, such as distinct

patches of exudation, sometimes isolated, sometimes arranged along the course of the blood-vessels, and more or less completely surrounded by irregular masses of pigment. The participation of the retina in the inflammatory process is further corroborated by the presence of scotomata in the field of vision, diminution of the central and peripheral vision, micropsia, and metamorphopsia.

2. **Simple Retinitis.**—This inflammation, strictly confined to the retina, and first described by Jacobson, is a much rarer disease than the preceding one, and its existence has often been disputed, mainly because ophthalmologists have differed as to the form of inflammation of the retina which occurs in syphilis. It is usually diffuse in character, and characterized by the following ophthalmoscopic symptoms: The fundus may be generally faintly cloudy and indistinct, or there may be a distinctly defined mistlike, grayish opacity extending over the papilla, and like rays along the course of the blood-vessels toward the periphery. Toward the equator of the eyeball this mist disappears entirely and the fundus presents its normal appearance. The outlines of the papilla are blurred or washed out, and the disk is entirely surrounded as well as covered by a zone of gray, hazy retina. The disk may appear very hyperæmic, the congestion being much more vivid than that existing in the rest of the fundus (Plate XXIII, Fig. 3). The arteries are somewhat reduced in caliber, or seem so in comparison with the engorged condition of the veins. The latter are only partially concealed by the general œdematous cloudiness, and in places appear clearly and with a widened irregular reflex. They are often very tortuous, but the curves of these tortuosities are not perpendicular to the plane of the retina, as in optic neuritis, but rather coincide with this plane. There are no floating opacities nor any fixed, dustlike opacities in the vitreous, and the reflex of the retinal opacity passes through a clear medium to the eye of the observer. The subjective symptoms are as follows:

1. Diminution of central vision, sometimes slight, sometimes very marked, the visual acuity falling to a tenth and in rare cases to one-hundredth of the normal. When the loss of vision is marked it is due to central scotomata, which are usually annular, though never completely so. Sometimes, however, these defects in the field of vision are sector like, and extend far toward the periphery.

2. Hemeralopia, or so-called "night-blindness," in which the acuity of vision rapidly diminishes as the light fails. Such patients can scarcely find their way about in the evening or in dark places.

3. Photopsic manifestations, such as transparent bright spots, which vibrate or rotate rapidly around the fixation point.

4. Micropsia and metamorphopsia.

5. Photophobia and sometimes lachrymation in consequence.

The prognosis of simple syphilitic retinitis is usually favorable, especially if promptly treated. The vision is gradually restored, the cloudy fundus clears up, and the scotomata disappear. The disease is, however, subject to frequent relapses, and if treatment prove futile the case ends in atrophy of the retina, chorioid, and optic nerve, with development of pigment in the chorioid and outer layers of the retina. When the chorioid becomes involved, opacities appear in the vitreous, and are more or less permanent. When the optic nerve becomes atrophied the disk assumes a distinctly dirty-yellow hue very different from the dense white or bluish-white appearance usually met with in atrophy from other causes.

3. **Exudative Retinitis.**—This variety is less common than the preceding forms of inflammation. Here the inner layers of the retina are involved, and the process is distinguished by more or less extensive exudation of a yellowish deposit in the form of irregular patches in the inner layers of the retina, sometimes distinctly elevated above the surface. These may be scattered all over the fundus, but are usually grouped around the posterior pole of the eye. There is usually some exudation on the head of the optic nerve, and the vessels are more or less obscured. This form of inflammation may be accompanied by hæmorrhages, which are usually grouped around the patches of exudation, but sometimes are observed along the blood-vessels.

4. **Retinitis with Hæmorrhages,** in consequence of endarteritis and the formation of thrombi, is a rare form of syphilitic disease. The ophthalmoscopic image of such a case does not differ in any respect from the same variety of retinitis due to some other cause than syphilis. The hæmorrhages are numerous and of all varieties, though they are more apt to be punctate or circular. The veins and arteries possess the usual appearances of disease of the vascular walls, and there are the same disturbances of the circulation and the same general œdematous condition of the retina. The changes in the walls of the blood-vessels are sometimes very marked.

5. **The Central Recurring Retinitis,** first described by Von Graefe, is the rarest of all the varieties of syphilitic retinitis. It is characterized by an opacity in the vicinity of the macula lutea, and the appearance of small, white, punctate dots grouped together in the macula. The disturbance of vision and the opacity or cloudy infiltration round the macula appear suddenly, but generally disappear in a few days, only to recur in a few weeks. In subsequent attacks, in addition to the punctate deposit at the macula, there occur irregular white streaks, radiating from the optic disk into the retina, usually in the course of the vessels, which are sometimes distinctly elevated, and also the same punctate deposits scattered all over the fundus.

II. SYPHILIS OF THE OPTIC NERVE.

Syphilitic affections of the optic nerve, whether in its orbital, intracranial, or intra-cerebral portions, can not be certainly diagnosticated by the quality or intensity of the symptoms, but rather by the peculiar combination of the symptoms in a given case. The optic nerve may be affected by syphilis in two ways: either marked by visible changes in the optic papilla, or accompanied by no demonstrable changes in the disk. Where there are visible changes in the papilla, these may be of three kinds, viz.: 1. There may be choked disk or papillitis as a symptom of all the various intra-cranial processes. 2. There may be neuritis descendens accompanying the various encephalic and meningeal processes, which have extended along the sheath of the optic nerve and involved the substance of the nerve, or it may arise from a gumma in the nerve. 3. There may be atrophy of the optic nerve, the result of choked disk due to some intracranial process, or of neuritis descendens due to some encephalic or meningeal process, or to some spinal lesion.

When there are no demonstrable ophthalmoscopic changes in the papilla the symptoms are—1, either an amblyopia or amaurosis syphilitica, due to disease of the blood-vessels, which may either be transient or end in atrophy of the optic nerve; or, 2, hemianopsia dependent on disease of some portion of the optic tract between the chiasm and the occipital lobe, which leaves a permanent defect; or, 3, a flittering scotoma.

The optic nerve may be affected in some portion of its entire course between eye and brain independently, or secondarily by propagation of the morbid process from the surrounding tissues. In almost all intense inflammatory processes in the retina, the optic disk or papilla is also involved, and the lesion is therefore a neuro-retinitis. The papilla is slightly swollen, its outlines are indistinct, the central vision is decidedly diminished, while peripheral vision and the color sense are but slightly affected (Plate XXII, Figs. 3 and 4). Two varieties of neuritis must here be differentiated the one from the other—choked disk or papillitis and neuritis descendens. Both these forms of inflammation, when both eyes are simultaneously affected, prove that the process has involved either the optic nerve or the sheath or both, and further observation must then decide whether the lesion is intra-cerebral, extra-cerebral, intra-cranial, or orbital in situation.

Papillitis.—Inflammation of the intra-ocular end of the optic nerve is characterized by an intense, steep, irregular swelling of the optic disk, the outline of which is concealed by the œdematous infiltration, marked stasis in the retinal veins, and ischæmia in the retinal arteries (Plate XXIII, Fig. 1). In neuritis descendens, on the contrary, the papilla is much less œdematous, and there is little or no condition of stasis in the retinal veins, but the opacity and œdema are apt to extend farther into the retina, and are frequently accompanied by hæmorrhages and whitish patches of exudation. In addition, we sometimes meet with a ring of small, white, punctate exudations around the macula lutea, resembling those seen in retinitis albuminurica. Still, it is not always easy to distinguish the one form from the other, for both forms may coexist simultaneously.

While bilateral papillitis points to the existence of some intra-cranial process which has caused an increase of the intra-cranial tension and thus indirect compression of the optic nerve, neuritis descendens indicates the presence of an inflammatory process, which has involved either the sheath of the optic nerve or the nerve itself, and this is generally basilar meningitis.

While papillitis indicates the presence of an increased intra-cranial tension, it does not indicate whether the cause of this increased tension is a sarcoma, or an echinococcus cyst, or a gumma, nor does the ophthalmoscopic picture enable us to locate the lesion. If the papillitis is unilateral, the lesion may be situated entirely within the orbit; but if it is bilateral, the seat of the lesion is in all probability central. The syphilitic nature of the process must, however, be diagnosticated from the history of the case and the accompanying symptoms.

Syphilitic lesions of the brain may be either a circumscribed gummy tumor, or morbid processes in the large blood-vessels, especially at the base, or diffuse gummatous infiltration of the membranes at the base or on the convexity, which involve the brain substance secondarily. A circumscribed gumma occurs most frequently in the dura mater, either between dura and bone or between dura and arachnoid, more rarely in the subarachnoid space, whence it may extend to the brain substance. It is rarely met with in the interior of the brain. The morbid changes in the great vessels occur in the elastic lamella of the intima and in the endothelium. These narrow the lumen of the vessel, and thus cause thrombosis, which is sometimes complete.

If a gumma be suspected, the first step is to determine whether it is at the base of the brain or in the cortex. Gummata of the base usually cause lesions of other cranial nerves besides the optic, such as the third, sixth, and seventh. Gummata at the convexity frequently cause symptoms of nervous irritation, and even epileptiform attacks.

The defect in vision does not always correspond to the visible ophthalmoscopic changes in the disk. Even with a most marked papillitis there may be very little disturbance of vision and no defect in the visual field, and this is explained by the fact that the layer of rods and cones of the retina are still intact. In other cases, where the papillitis may be less marked, especially if neuritis descendens is also present, the axis-cylinders are involved in the process, and there is very marked disturbance of vision.

Neuritis Descendens.—This depends upon inflammatory changes in the nerve substance itself, and is usually caused by an extension of an inflammatory process from the surrounding tissue to the sheath of the nerve and thence to the nerve-fibers, or by its pressure setting up an irritative and inflammatory process in the nerve, and this process may extend even from the central parts of the brain.

Unilateral neuritis descendens points to the presence of a lesion in the corresponding nerve-trunk between the chiasm and the orbital end of the nerve. *Bilateral neuritis descendens* points to a lesion in the nerve somewhere between the chiasm and the occipital lobe. The most common causes of neuritis descendens are encephalic and meningeal processes, but further than this we can not go, merely from the ophthalmoscopic examination. The origin of these cases is probably to be found in diseased processes in the walls of the vessels, first described by Heubner, particularly in the basilar arteries and the arteries of the fissure of Sylvius and their branches.

In neuritis descendens, peripheral vision is usually first affected, and the defect gradually extends to central vision; while in perineuritis the reverse occurs, central vision being first affected, and thence the defect extends to the periphery of the field. This depends upon the peculiar arrangement of the nerve-fibers in the optic nerve. The fibers at the periphery of the nerve are distributed to the region of the macula, while the central fibers supply the periphery of the retina.

Both papillitis and neuritis descendens may end in atrophy of the optic nerve if not properly treated.

Atrophy of the Optic Nerve.—Three forms of atrophy of the optic nerve, due to syphilis, are met with, as follows: 1. Neuritic or inflammatory atrophy, the result either of papillitis or neuritis descendens. 2. Cerebral atrophy. 3. Spinal atrophy.

1. *Inflammatory Atrophy.*—Here the optic disk is opaque, of a dirty, grayish-blue color, with blurred, irregular outline, the point of exit of the vessels obscured as by a mist; the arteries are reduced to threads and surrounded by white streaks, due to a thickening of their adventitia, and the veins are reduced in caliber.

2. In the *Cerebral Form of Atrophy* the disk is brilliantly white, the outline is sharply defined, the lamina cribrosa is very distinct, and the arteries and veins are only slightly reduced in caliber (Plate XXIII, Fig. 2).

3. In the *Spinal Form of Atrophy* the papilla is bluish or bluish-green in color, the outline is sharply defined, the lamina cribrosa is very brilliant, and the vessels are but slightly reduced in caliber. The latter is the form which is met with in spinal processes due to syphilis, especially locomotor ataxia.

In the cerebral form of atrophy the cause has been some process in the brain which, by setting up some disturbance in the circulation or by direct compression of the optic nerve, has led to descending atrophy of the disk, without any ophthalmoscopic sign of inflammation.

Finally, we have to consider those cases in which there is no ophthalmoscopic evidence of disease of the optic nerve. Here we must depend entirely upon the presence of functional disturbances to form an opinion as to the location of the lesion. These cases have received the names of amblyopia and amaurosis syphilitica. If the loss of vision is confined to one eye, the lesion may be in front of the chiasm, though it may be cerebral in origin, and situated in the posterior part of the internal capsule, or even in the cortex. If it is in the internal capsule, there is also present contralateral anæsthesia of the other cranial nerves and of the surface of the body, which will not be present if the lesion is in the cortex. In many of these cases it is possible that eventually some signs of atrophy will appear in the optic disk.

In *Hemiopia Fugax*, or flittering scotoma, and in typical hemianopsia, there may be absolutely no ophthalmic evidence of disease. Both these forms of defect in the visual field must be regarded as due to a lesion in one optic tract. In hemianopsia lateralis sinistra the lesion must be sought in the right optic tract. In hemianopsia lateralis dextra it is in the left optic tract, between the chiasm and the occipital lobe of the cerebrum, and usually between the cerebral peduncle and the chiasm.

VIII. SYPHILIS OF THE OCULAR MUSCLES AND MOTOR NERVES.

So far as our present knowledge goes, pure myopathic processes are met with very seldom in the ocular muscles, for the syphilitic lesion almost always involves either the motor nerves or their nuclei. The site of a lesion causing paralysis of one or more of the ocular muscles may be either cerebral, basilar, or orbital. In the latter case we must distinguish between neuropathic and myopathic lesions. It may, however, be assumed *a priori* that syphilitic lesions of the orbital walls, which are here the most frequent, can not readily be conceived as involving the nerve alone, as the origins of the ocular muscles are grouped closely around the entrance of the optic nerve, and the bony margin of the foramen is narrow.

Syphilitic lesions in the intra-orbital portion of the motor nerves have never been reported. It might happen that the lesion would involve the muscle alone, but no cases of pure muscular disease in the orbit have ever been published, though Zeissl has assumed such a condition in one case reported by himself. Small exostoses or slight periosteal swellings would not be likely to excite muscular paresis, owing to the protection afforded by the presence of the orbital cellular tissue, with the exception, perhaps, of the superior oblique muscle, which runs closely along the roof of the orbit. Larger tumors of this region, by congestion and direct pressure, would cause such marked changes of shape and situation of the eyeball that a simultaneous muscular paralysis would probably not be noticed. Hence, paralyses of the ocular muscles of orbital origin have been rather assumed to exist than actually observed.

Our knowledge of the intra-cranial causes of syphilitic paralysis of the ocular muscles is more exact. The dura mater, like the periosteum, is a favorite seat of syphilitic disease, especially gummy infiltration. Such lesions occur on the convexity as well as at the base of the brain, but particularly in the latter. The third or oculomotor nerve, passing through the dura, along the side of the sella turcica; the fourth, or trochlear nerve, which makes its exit at the apex of the pyramid; and the sixth or abducens nerve, which makes its exit at the upper part of the sloping surface of the body of the sphenoid, are all very apt to be involved by lesions situated at the base of the skull. Furthermore, the arachnoid and pia mater may be the seat of syphilitic lesions, even at an early period of constitutional syphilis, without the dura mater being involved.

In the brain substance itself—that is, in the pons, the corpora quadrigemina, the cerebral peduncles, and cerebellum—the causes of ocular paralyses are much more rarely met with. They occur more commonly when the meningeal processes extend into the brain substance along the vessels, compress the latter, and by cutting off the blood-supply cause necrobiosis, and give rise to patches of softening. Syphilitic endarteritis, so graphically described by Heubner, by means of cellular development between the endothelium and the connective tissue beneath, and by accidental inflammation of the muscular and adventitious coats, plays an important part in the causation of cerebral lesions, since it causes narrowing and obliteration of the vessels with all their consequences. But, from the nature of the vascular distribution, this form of lesion rarely has any effect in inducing disturbance of motility of the ocular muscles.

Another possible cause of ocular paralysis, though very rare and but recently recognized, is gumma of the brain substance. Another probable cause is found in certain little understood irritative conditions, or chronic inflammation of the neurilemma and perineurium of the brain substance, or of the nerves themselves. Virchow thinks that the simple ossifying or gummatous meningitis of the base of the brain is the most frequent cause of the syphilitic paralysis of the ocular muscles. A meningitis in the vicinity of the sella turcica, for instance, would almost certainly involve the foramen opticum.

The question of the orbital, meningeal, or cerebral location of the lesion is still very uncertain. If the existing paralyses are symmetrical, the lesion is probably not in the orbit. Intense headaches, with complete paralysis of one or more nerves, as well as equal paresis of all branches of the third nerve, or bilateral muscular disease with complications on the side of the optic nerve and trifacial nerve, point to the existence of a meningeal lesion, so long as there are no symptoms indicating the existence of foci of cerebral disease. We may also assume the presence of a central lesion when the paralysis is incomplete in extent and intensity, and remains unilateral and single. Spots of softening and gummata must involve relatively considerable space, in order to affect collectively fibers, which in their course through the brain diverge so far from each other. The root of the oculomotorius is of great extent, for, in its course through the cerebral peduncles to the corpora quadrigemina it partially surrounds and partially traverses the nucleus tegmenti and the cerebellar crus. Lesions anywhere in the course of this nerve might give rise to the most varied forms of ocular paralysis.

Another possible lesion is, that a focus of disease may simultaneously destroy the function of the third and fourth nerves, or the sixth and seventh nerves of one side, since the nuclei of the third and fourth nerves are as close together as the nuclei of the sixth and seventh nerves. Furthermore, in endeavoring to diagnose the nature and location of these intra-cranial lesions, it should not be forgotten that the fourth, and probably also the third nerve, undergoes an intra-cerebral decussation, while the sixth or abducens nerve does not.

Statistics gathered from many sources seem to show that the majority of all cases of ocular paralysis are limited to a branch of the third or oculomotor nerve. The only possible explanation of these cases is to assume that the lesion has involved a part of the nerve-nucleus, or a branch of the nerve after its division in the orbit; for a lesion attacking the entire bundle of fibers at the base of the skull would not easily destroy one group of functionally connected fibers and leave all the others intact.

Complete paralysis of one or both third nerves is almost always caused by a lesion situated in the intra-cranial though extra-cerebral portion of the nerve.

The *symptomatology* of paralysis of the ocular muscles is the same, whether the cause be syphilitic or not. The most marked subjective symptom is diplopia, or double vision, which is of several kinds. If the patient, with both eyes open, sees any object of fixation doubled, there may be one or several muscles paralyzed. Generally speaking, if the double images are crossed, the right image corresponding to the left eye and the left image to the right eye, the nerve affected is the third, and this may be in one or both eyes. If the images are homonymous, on the same side as the corresponding eye, the sixth nerve is affected. If there is a difference in the elevation or height of the images, the superior or inferior recti muscles are involved, which indicates again a lesion of the third nerve. If there is an inclination of the upper or lower ends of the double images toward each other, then either the superior oblique muscle is paralyzed, in which case the fourth nerve is involved, or the inferior oblique muscle is paralyzed, in which case it is again the third nerve which is the seat of the disease. When the entire trunk of the third nerve is diseased, there is ptosis of the upper lid from paralysis of the levator muscle, and on lifting the lid the eye is seen to be divergent, the iris is moderately dilated and immovable, and the accommodation is very limited or entirely absent, owing to paralysis of the ciliary muscle.

Partial paralysis of one or more muscles is much more frequently met with than total paralysis of all the muscles supplied by the third nerve.

The *prognosis* is good, if the case is seen early and proper treatment at once instituted and persistently pushed to toleration. The longer the paralysis has lasted the more unfavorable becomes the prognosis.

IX. SYPHILIS OF THE ORBITAL WALLS AND CONTENTS (EXCLUSIVE OF THE ADNEXA OF THE EYEBALL).

Disease of the bony walls of the orbit is not a very common manifestation of constitutional syphilis, though it is by no means rare. The lesions which occur here are: 1. A periostitis or osteo-periostitis, with or without subperiosteal abscess. 2. Gummy tumor or syphiloma of the periosteum. 3. Periostosis, hyperostosis, or exostosis of one or more bones. 4. Caries and necrosis, involving more or less of the entire thickness of the bony walls.

Some of the symptoms of these lesions are slight in severity and transient in duration, and often are not pronounced enough to attract the attention of any one but the patient. These lesions belong to the late stages of syphilitic infection, though the most recent investigations point to the existence of two forms of periosteal disease due to syphilis, which are to be distinguished from each other by the intensity of the process and the period of constitutional infection at which they occur. The cases of syphilitic osteitis and periostitis developed during the early period of constitutional taint are much less severe than those observed later. The latter are accompanied not only by subperiosteal and osseous gummata, but also by dense osteitis and necrosis. In all cases of syphilitic bone disease the exciting cause is generally found in contusions, repeated bruisings, and slight injuries.

Osteo-periostitis.—Simple syphilitic periostitis or osteo-periostitis, occurring as an early or precocious bone lesion, is limited to the surface of bone, to the periosteum and superficial layers. Under the periosteum, between it and the bone, are accumulated large numbers of round cells, analogous to the cells of the embryonic medulla. At the same time the deep layers of the periosteum are inflamed, and contain cells between the fibrous bundles. The neighboring connective tissue generally shows some inflammatory œdema. From a histological standpoint, simple osteo-periostitis of the bones of the orbit consists in the return of the cells between the bone and the periosteum to the embryonic state. The new osseous products consequent on periostitis, such as osteophytes, exostoses, enostoses, and eburnation, constitute the accidents common to all forms of syphilitic bone disease. The exuberant formation of the new osseous lamellæ may develop under the periosteum exostoses of varying size, and in the bone itself a parenchymatous hyperostosis and eburnation.

Gummous Periostitis.—The gummy osteo-periostitis is a variety of rarefying osteitis in which the subperiosteal embryonic tissue takes on the disposition observed in gummata. Gummata of bone, though common in the other cranial bones, are rare in the bones of the orbit. What are called external gummata originate beneath the periosteum, and by pressure gradually detach it from the bone. They also press upon the underlying bone, enter its substance in the form of a cone, the bone becomes infiltrated, and progressive rarefaction goes on up to a certain point. Then the gumma ceases to advance, undergoes lardaceous or fatty metamorphosis, and finally disappears, leaving in its place a more or less extensive depression in the bone. The frontal bone seems to be the region of predilection for these gummata. When a small gumma of the orbital periosteum has formed a cavity in the bone, and the inflammatory process has stopped, the new matter becomes caseous and atrophies; the peripheral periostitis heals, and there may be a partial reparation of bone. The cavity is not entirely filled, but the osteophytes developed beneath the periosteum end in a bony neoplasm at the margin of the loss of substance. If, however, the bone is completely perforated, the defect is filled up by a fibrous cicatrix.

The two essential signs of syphilitic orbital osteo-periostitis are pain and swelling, the former most intense at night and sometimes very violent. To these two symptoms is added a third, exophthalmus, or protrusion of the eyeball beyond the plane of the opening of the orbit, if the bony lesion be extensive or situated deeply in the orbit. The neuralgia, due to compression of a nerve filament at some point in its passage through a bony canal, is a common symptom. Subperiosteal gummata are generally accompanied by inflammation of the skin, long suppuration, necrosis of portions of bone which remain imprisoned for a long time, and which are eventually cast off, leaving behind great losses of substance.

These bony lesions are sometimes not recognized in the orbit during life, and are only revealed at the autopsy.

These lesions of the bony orbit, though generally regarded as late manifestations of constitutional syphilis, are by no means uncommonly met with early in the disease. In the adult, orbital periostitis, occurring as an early lesion, tends to resolution spontaneously, and when properly treated it rapidly subsides without leaving any trace. It is circumscribed, varies in duration between four and six weeks when left to itself, and disappears much sooner under proper treatment. Still, such an early lesion in the bones of the skull aggravates the prognosis, though the other constitutional symptoms may be slight. These cases of precocious periostitis are confined to the periosteum, are never followed by hyperostosis or exostosis, and never leave any trace of their presence. Large, hard, frontal bosses, which may involve the entire supraorbital margin, and dip down deeply in the orbit, rapidly disappear under appropriate treatment.

Two forms of periostitis, acute and chronic, may be distinguished. The *acute* form is almost always a precocious lesion. The patient complains of great pain in and around the eye, especially along the supraorbital margin, which is excessively sensitive to pressure, even when the periostitis is deep-seated and does not involve the orbital margin. The eyelids are red and swollen, and the ocular conjunctiva is injected and sometimes chemotic. There is more or less protrusion of the eyeball, the exophthalmus being rarely straight forward, but usually toward one side or downward, owing to the periostitis being confined to one wall or part of the body. The general constitutional signs of inflammation are usually severe. There may be danger of loss of vision by pressure on the optic nerve in the optic foramen or in the orbit, or loss of the eye by strangulation of the entire blood supply of the globe by the infiltrated orbital tissue. Optic neuritis, followed by inflammatory atrophy of the optic nerve extending to the sheath of the nerve from the periosteum of the orbit and optic foramen, and simple atrophy of the optic nerve from pressure by the surrounding infiltrated tissues, are not very uncommon results of orbital osteo-periostitis. The pain may occur only periodically at certain times of the day. The attack may be ushered in by a chill, followed by high fever.

In the *chronic* form the inflammatory symptoms are far less pronounced, and the disease is more protracted and insidious in its course. There may be little or no febrile excitement, but little pain, and no protrusion of the eyeball until late in the course of the disease, unless the periostitis involves the orbital margin. Here the œdematous swelling of the surrounding parts, the decided thickening of the bone, and the presence of a hard, indistinctly fluctuating tumor, which is painful and sensitive, all aid in the diagnosis.

Caries and Necrosis.—The chronic form is often accompanied by the formation of a subperiosteal abscess, which sometimes strips up the periosteum from the bone for a long distance, and ends in caries and necrosis. This abscess tends to open at some point, usually through the conjunctiva or lid, by one or more sinuses; but the suppurative action may be very extensive, and open into the nose, the frontal sinus, the maxillary sinus, or into the cavity of the skull. If the abscess perforate through the conjunctiva, the seat of the bone lesion is almost certainly deep in the orbit, for if the margin of the bony orbit were involved the opening would be through the lid, in front of the tarso-orbital fascia. If the tendency of the suppuration is slight, the periosteum may become very much thickened, and small periosteal growths may be developed, which may ossify and form true exostoses. Pieces of loose bone very rarely come away, for, though the bones here may be thin, they are very hard. Moreover, the caries is almost always superficial. Sometimes the disease may begin as a real osteitis and involve the periosteum secondarily, and these are probably the worst cases, for the lesion is usually situated deep in the orbit. Several sinuses may form in the lids or surrounding structures, in different directions, and an ichorous discharge may last for an indefinite period, ending either in deeply retracted cicatrices or in eversion of the eyelids.

In all cases of caries it is safer and better to remove all pieces of loosened bone, even from the roof of the orbit, through a free opening, thus doing away with one source of cerebral irritation, and bringing about free drainage. If the ethmoid is involved, we should remove as much of the diseased bone as can be reached, and then introduce a drainage-tube through the nose. The same thing holds true of the lachrymal bone.

The varieties of chronic hyperplastic bone disease met with in the orbit are *periostosis*, *hyperostosis*, and *exostosis*.

Periostosis is a rare process in the orbit. It is probably a chronic periostitis which has ended in induration or sclerosis, forming a more or less circumscribed tumor along the orbital margin. It is a thickening of the periosteum, and, if circumscribed, the tumor might well be called a node.

Periostosis is always a late manifestation of syphilis, originating in the periosteum and usually confined to it. It is sensitive to pressure, and painful at certain periods of the day. It is probable that these nodes occur deep in the orbit, at or near the apex around the optic foramen, oftener than is usually supposed. It is probable that many cases of paralysis of the ocular muscles, coming on gradually, are due to a periosteal node pressing on the muscle or its nerve branch in its course or near its origin, producing at first paresis and then paralysis by direct pressure, as it grows. Such a node growing from the periosteum at the extreme bottom of the orbit, might readily involve the origins of all the straight muscles of the eye, and also the optic nerve, and produce blindness from atrophy of the

PLATE XXII.

Fig. 1.

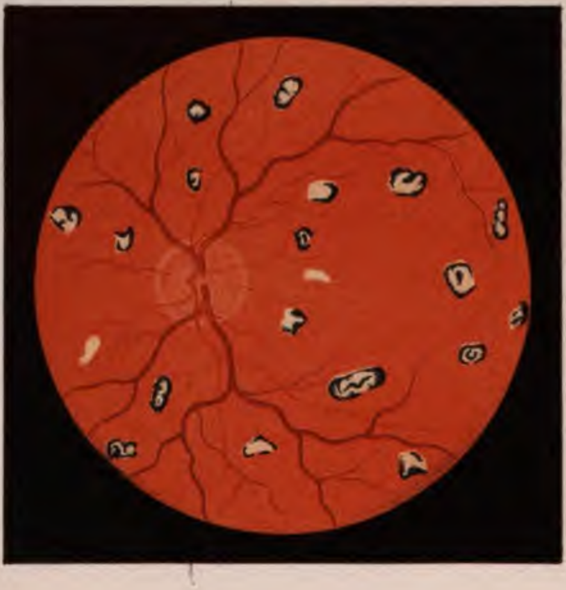


Fig. 2.

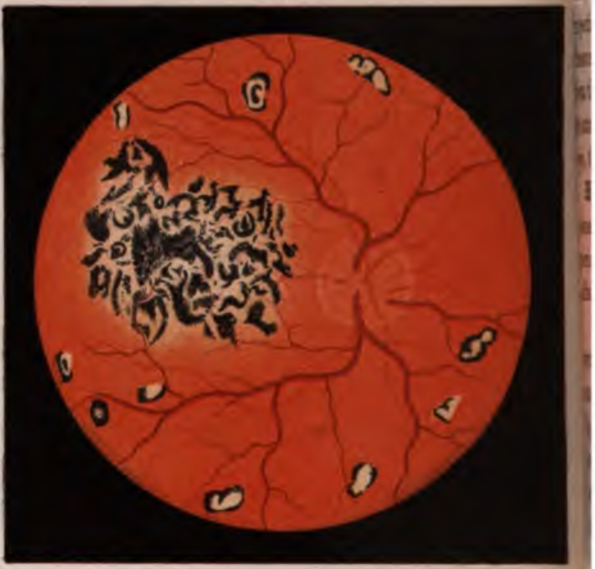


Fig. 3.

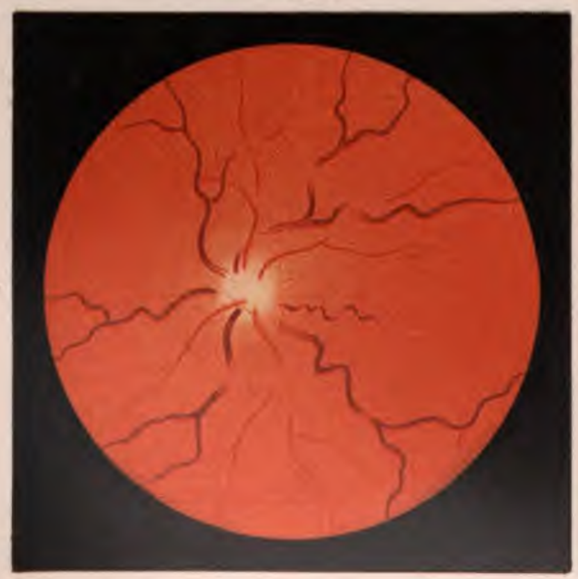
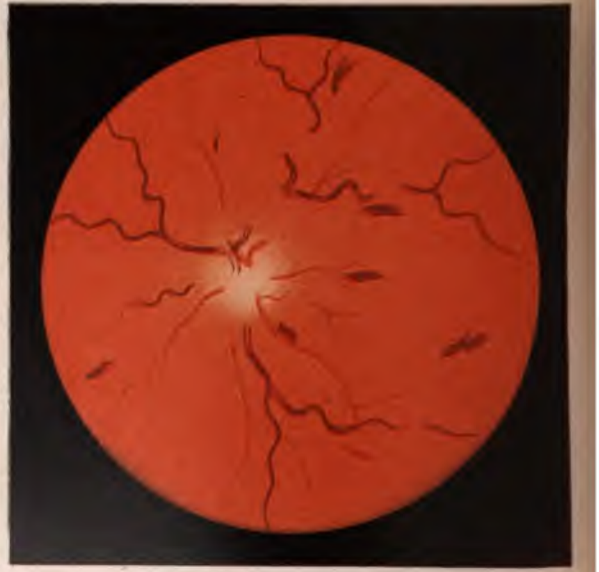


Fig. 4.



nerve. This form of periostitis involved in periostosis does not tend to spread, and hence is but little likely to involve the orbital tissue. Any projection of the eyeball, or exophthalmus, is due to the periostosis. Pressure of the eyeball backward causes pain, but the process may go on from the beginning without any pain, and the patient's attention may first be attracted by the exophthalmus, more or less impaired motility of the eye, then diplopia, and finally impairment of vision.

Hyperostosis due to syphilis is the rarest of all the affections of the bones of the orbit. It is a disease of the bone tissue itself and not of the periosteum. It may go on without any signs of inflammation, and may affect the entire thickness of the bone.

The excessive development of one or more of the bones of the orbit occasionally produces very singular changes in the shape of this cavity, and is always accompanied by exophthalmus. This hyperostosis is a hyperplasia of bone, and is to be distinguished from exostosis. It is of ivory hardness, and never yields to constitutional treatment. It is more often due to some other cause than syphilis. Any operation for its removal is only justifiable when its presence acts as a mechanical hindrance to the functions of the eyeball, and its removal is then best effected by the employment of the dentist's drill.

Exostoses of the orbit are outgrowths from the periosteum or bones toward the orbital cavity. They differ from the swelling and projection of periostosis in size and shape, and somewhat also in location. Though occurring in all parts of the orbit, they are more frequently met with on the inner wall and near the margin of the orbit than toward the apex of the orbit. They are smaller than a periostosis, with a narrower base, but project farther into the orbital cavity. They are always covered by periosteum, and frequently do not involve the subjacent bone at all. They occur more frequently than either periostosis or hyperostosis. They may develop in consequence of long-continued chronic periostitis, as direct outgrowths from beneath the periosteum. If they are situated deeply in the orbit, the most marked symptom is exophthalmus. The os planum of the ethmoid is a favorite seat of exostoses.

When they occur anteriorly and admit of digital examination, they are recognized as hard, smooth elevations, with circumscribed base, not usually painful on pressure, but generally causing pain by pressure on the eyeball, or on the nerves within the orbit. Though generally of slow growth and a late manifestation of constitutional syphilis, they may advance rapidly in size and be accompanied by signs of acute periostitis. The more deeply in the orbit these exostoses are situated the more apt are they to escape attention. When near the apex their pressure on the ciliary nerves or on the ophthalmic branch of the trifacial may cause deep seated pain, and excite suspicions of the presence of an intra-cranial tumor, or periostitis, or even meningitis. If the pressure is so excessive or continuous as to interfere with the return circulation from the eyeball, the ophthalmoscope may reveal the presence of neuro-retinitis with choked disk, or an atrophic condition of the optic disk.

Treatment.—The treatment of these cases should always at first be constitutional, for these exostoses in the orbit sometimes disappear very rapidly under the combined use of mercury and potassium iodide. It may, however, become advisable, and even necessary, to resort to operative interference for the removal of these orbital exostoses. Generally a pair of strong bone-forceps will suffice for their removal, as they usually have a narrow base, or pedicle; if the base be broad and thick, the chisel and gouge may become necessary.

EXPLANATION OF PLATE XXII.

Fig. 1, a well-marked example of choroiditis areolaris disseminata due to acquired syphilis. Most of these patches are grouped around the posterior pole of the eye, though some of them extend toward the periphery.

Fig. 2, an example of both varieties of choroiditis—choroiditis areolaris disseminata and choroiditis centralis. In addition to the scattered patches, there is a large irregular patch in the region of the macula lutea, which has reached the atrophic, pigmented stage. (From Juler's Ophthalmic Science and Practice.)

Fig. 3, a well-marked example of neuro-retinitis, with much œdematous infiltration of the optic disk and neighboring zone of the retina.

Fig. 4, an example of neuro-retinitis, with hæmorrhages mainly from the veins, which is not usual in syphilitic retinitis.

EXPLANATION OF PLATE XXIII.

Fig. 1, an example of "choked disk," or papillitis of the optic nerve, sometimes met with in syphilitic patients. The veins are seen enormously swollen and very much distorted, while the arteries are relatively very small and absolutely reduced in caliber. (From Loring's Text-Book of Ophthalmoscopy, vol. ii.)

Fig. 2, atrophy of the optic nerve. The disk is seen of a white or grayish-white color; the arteries are very much reduced in caliber, some of them being mere threads, while the veins are somewhat increased in diameter. An example of simple, non-inflammatory atrophy. (From Juler's Ophthalmic Science and Practice.)

Fig. 3, syphilitic retinitis. Through the atrophy of the epithelial layer, the fundus has acquired the appearance of a diffuse choroiditis, with marked changes in the pigment and stroma. The sketch at the bottom shows the development of flecks of pigment which differ from those of retinitis pigmentosa in not having the bone-corpuscle shape. (From Loring's Text-Book of Ophthalmoscopy, vol. ii.)

Fig. 1.

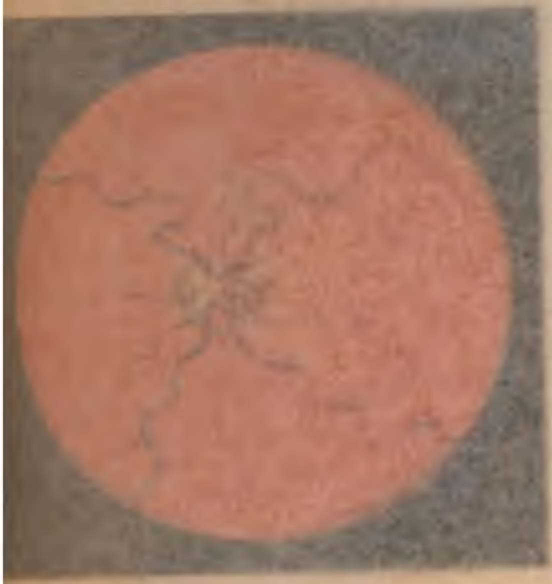
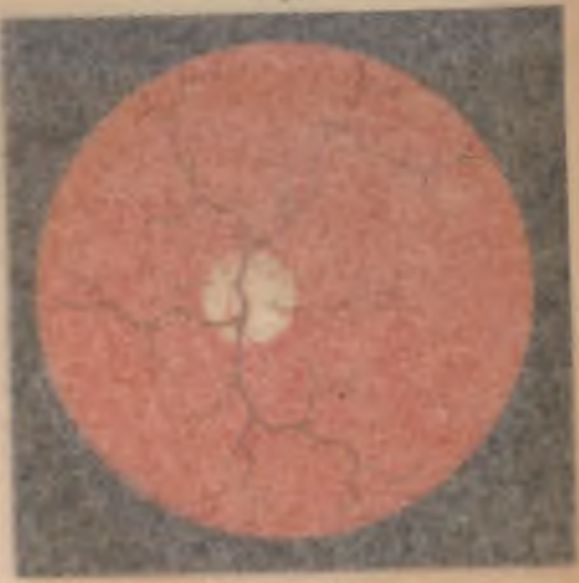


Fig. 2.



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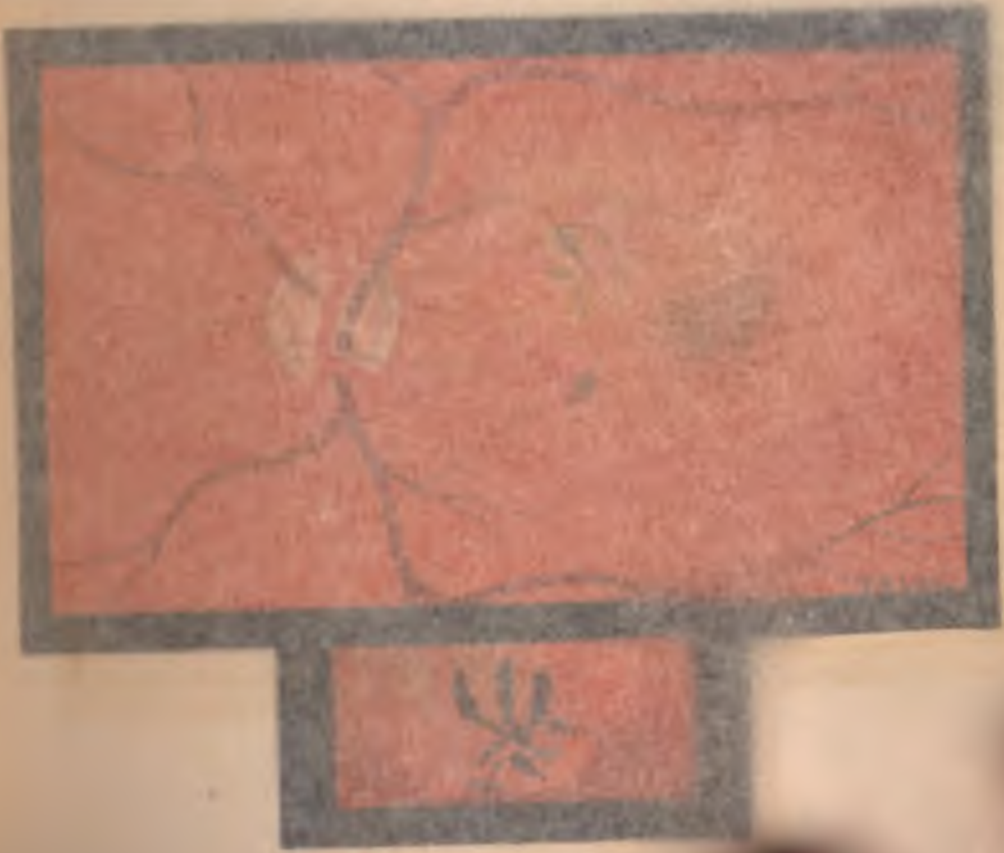
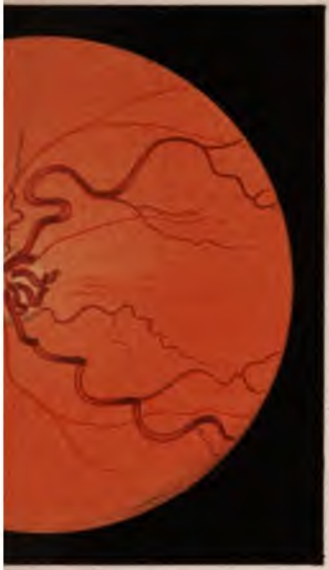


PLATE XXIII.

Fig. 1.



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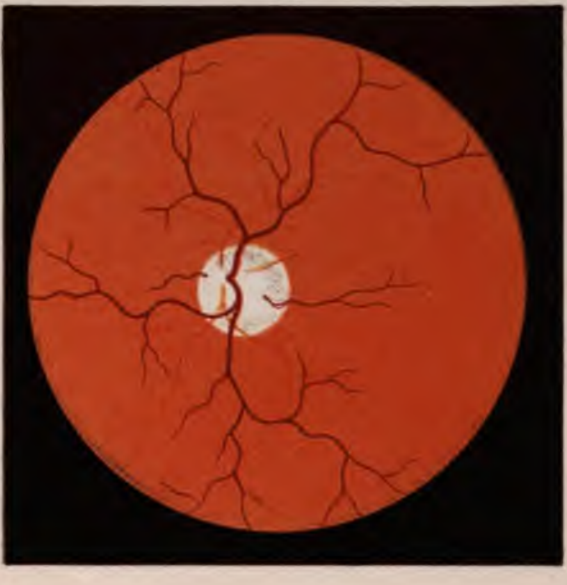

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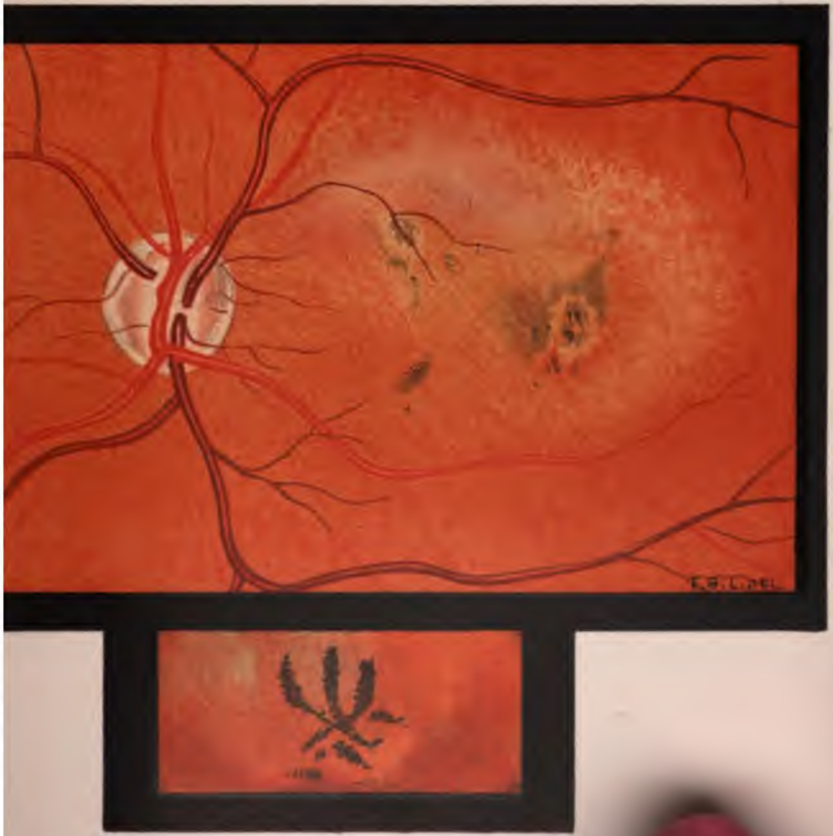


DISEASES OF THE EYE AND ITS APPENDAGES DUE TO INHERITED SYPHILIS.

BY CHARLES STEDMAN BULL, M.D.

I. CONJUNCTIVA AND EYELIDS.

THE poison of inherited syphilis does not seem to have any marked tendency to manifest itself either in the conjunctiva or eyelids, though patches of excoriation and actual loss of substance are occasionally met with in connection with similar manifestations on the face and scalp. The skin of the lids, as of the face, in syphilitic infants, is usually thick and opaque, and the ciliary margins of the lids often show little pits and scars, the signs of former eruptions.

We sometimes meet with well-marked instances of tinea tarsi or real marginal blepharo-adenitis of syphilitic origin. In these cases there are small patches of excoriation on the ciliary margin of the lid, with sharply defined edges, which extend a varying distance into the skin surface of the lids. These patches are irregular in shape, and are apt to occur near the canthi. They cause great irritation and soreness, the whole length of the ciliary margin of the lid being usually inflamed and swollen. They resist obstinately all local treatment, unless accompanied by appropriate specific constitutional medication.

Treatment.—The parts should be cleansed with warm bichloride solution (1 to 2,000), and all scabs or crusts removed twice a day. An application should then be made of an ointment of calomel (grs. v to ℥ j), or of the red precipitate of mercury (grs. viij to ℥ j). The patient's dietary should be carefully regulated, and small doses of calomel (gr. ¼ to gr. j) administered alone or with syr. ferri iodid. and cod-liver oil.

The chronic form of conjunctivitis with some thin muco-purulent discharge, so frequently seen in syphilitic infants, is probably not syphilitic in origin, but rather due to neglected purulent conjunctivitis, or to lack of cleanliness in the care of the child.

There is no authentic case on record of mucous patches or gummata occurring in infants with inherited syphilis.

II. LACHRYMAL APPARATUS.

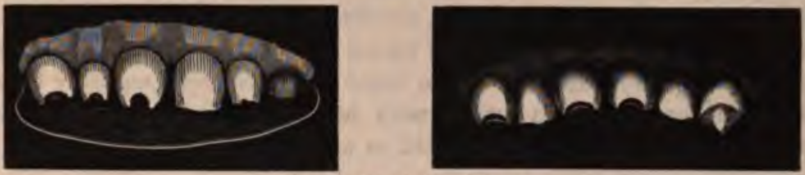
The lachrymal apparatus does not seem to be affected by inherited syphilis, unless secondarily in consequence of extension from the lachrymal bone or other bones of the orbit and vicinity, or from the neighboring cavity of the nose. Caries and necrosis of the lachrymal bone or nasal bone, and even of the frontal bone in syphilitic infants, has been known to cause purulent dacryocystitis by reason of the proximity of the lachrymal sac and nasal duct; but no case of primary disease of the lachrymal sac and duct, due to inherited syphilis, has been reported. The same may be said of the lachrymal gland.

III. SCLEROTIC AND CORNEA.

The *sclerotic* does not seem to be affected in inherited syphilis, except as an extension of disease from the cornea.

Our knowledge of the form of *corneal* inflammation, or *keratitis*, met with in children who are the subjects of inherited syphilis, we owe almost entirely to the observations of Mr. Jonathan Hutchinson, though this form of keratitis had long been recognized under the name of *scrofulous* or *strumous keratitis*.

Parenchymatous Keratitis.—Chronic interstitial, or parenchymatous keratitis, as it is now called, usually begins as a diffuse haziness near the center of the cornea of one eye, and at this stage there is no ulceration and little or no evidence of congestion. There is some complaint, however, of irritability of the eye, as well as of dimness of sight. Close examination shows that the haze or opacity consists of dots in the parenchyma of the cornea proper, and not on its anterior or posterior surface, and at first these punctate deposits are distinct from each other. In the course of a few weeks, or perhaps more rapidly, the whole cornea, except a narow rim at the periphery, has become more or less densely opaque by the extension and confluence of these interstitial opacities. Still, however, there are parts more densely opaque than others. The appearance of the eye in this stage has given rise to the name "ground-glass cornea" (Plate XXI, Figs. 3 and 4). The cornea is now usually surrounded by a zone of ciliary injection, and there is more or less intolerance of light and pain around the orbit. After a varying period of weeks or months the other cornea is attacked, and the inflammation goes through the same stages, but rather more rapidly. The loss of vision may be so great that there is bare perception of light. This condition lasts a varying length of time, and then the first cornea begins to clear. In certain cases, however, after the ground-glass stage has passed, a yet more severe one follows, in which the whole cornea becomes pink and even scarlet in color, from enormous development of vessels in the parenchyma; and here the crescentic fringes of blood-vessels are plainly visible at the periphery. Ulceration almost never occurs. The clearing up of the opacity is always excessively slow, but in the course of a year or more the improvement is decided. In the worst stage the surface of the cornea loses its smooth appearance and polish, reflects nothing clearly, and looks granular. Even in the most favorable cases the vision is never quite entirely regained. Almost all these patients present a peculiar physiognomy, consisting of a coarse, flabby skin, pits and scars in the face and forehead, scars of old fissures at the angles of the mouth, a sunken bridge to the nose, and a set of permanent teeth peculiar for their small size, bad color, and vertically notched edges of the central upper incisors. This crescentic-shaped notch in the cutting edge of the upper incisors is generally found associated with parenchymatous keratitis, though either may exist without the other. Where the two are met with in the same patient they may be regarded as pathognomonic of inherited syphilis. The keratitis may be accompanied or preceded by iritis, and is often followed by inflammatory and atrophic changes in the choroid.



Syphilitic Teeth (Hutchinson).

A large proportion of the cases of interstitial keratitis occur in children between the ages of eight and fifteen years. It is comparatively rare in infancy and early childhood, and is very rare in adult life. Statistics show that girls are oftener affected than boys.

The general condition of these patients is sometimes very bad, and at others apparently good. They usually have a peculiar pallor of the face. When the permanent teeth are first cut they are generally short, and narrow at their edges. In the edge is a crescentic portion, thinner than the rest, which after a time breaks away, leaving a broad, shallow, vertical notch, which is permanent for some years, but eventually becomes obliterated by premature wearing down of the tooth.

Prognosis.—If a case of interstitial keratitis be seen early, and before any large part of the cornea has become opaque, a favorable opinion may be given. If intolerance of light is an early symptom, and is extreme, the opinion must be much more guarded. In proportion as the photophobia is slight, the prospect is favorable. The recovery in any event will be very slow, and at best imperfect, which is due not only to the remains of some opacity, and the possible alteration in the shape of the cornea, but also to disease of the deeper tissues of the eye, notably the choroid and retina.

Treatment.—The dietary should be strictly regulated, and a rigid tonic treatment at once begun. A daily warm bath, followed by brisk rubbing with a coarse towel, and the inunction of cod-liver oil, from half an ounce to four ounces, according to the age of the patient, should be ordered. Iron in the form of the sirup of the iodide, with small doses of potassium iodide and tinct. nucis vom, should be prescribed. The cautious administration of mercurials should be begun, either externally in the form of ointment, or internally in the form of calomel. The latter must be very carefully watched, as these patients bear mercury badly. Locally, the eye should be bathed with hot water several times a day, atropine instilled, dark glasses should be worn, and, if the inflammation is acute, an occasional leech applied to the temple.

IV. UVEAL TRACT—IRIS, CILIARY BODY, AND CHORIOID.

I. IRITIS.

Inflammation of the iris in infants and young children, due to inherited syphilis, was first recognized and described by Lawrence in 1833. In the first edition of his Treatise on Diseases of the Eye he reports two cases. In one of these cases there were excoriations and ulcerations about the anus. The iris had lost its brilliancy and become dark-colored, was contracted and adherent, and the sclerotic was injected. In the second child, in addition to a general syphilitic eruption, both irides were affected, the iris being contracted and immovable, and the pupillary spaces opaque.

It is a rare symptom of inherited syphilis, and very often escapes notice mainly on account of the mildness of the symptoms. It is usually symmetrical, involving both eyes, but quite as frequently is confined to one eye. It appears to be more common in the female sex than in the male. It usually appears within the first six months of life. In a series of twenty-three cases published by Mr. Jonathan Hutchinson in 1863, the average age of the patients at the time of the beginning of the iritis was five and a half months. The oldest was sixteen months, and the youngest was six weeks. But cases have been reported in which the iritis had evidently commenced during the intra-uterine life of the fœtus, for at birth both irides have been found discolored and immovable, owing to adhesions to the capsule of the lens, and the pupillary space being more or less blocked by exudation. The effusion of plastic material is generally free, and the danger of occlusion of the pupil is great. Iritis in infants is seldom complicated by either keratitis or chorioiditis, and is usually attended by very few of the more severe symptoms which characterize the disease in adults. The absence of the ciliary injection or sclerotic vascular zone, and the very slight local symptoms which iritis usually causes, together with the fact that young infants generally keep their eyes closed, will account for the frequency with which it may be overlooked.

Most of the children who suffer from syphilitic iritis are those born within a short period of the date of the primary disease in the parents.

Prognosis.—In cases of intra-uterine iritis the prognosis is very unfavorable, as it usually results in the development of cataract, and probably to extension of the disease to the chorioid and retina.

Where the disease occurs in infancy or early childhood, the prognosis is generally good, provided it is recognized. Slight discoloration and sluggishness of the iris should excite our suspicions, even though there be no ciliary injection, and the instillation of atropia will often reveal patches of pigment on the lens capsule, after the iris has been dilated. Even cases in which the pupillary space has been blocked by effusion of lymph yield to proper treatment in a comparatively brief space of time.

Treatment.—Mercurials are very efficacious in promoting absorption of the effused lymph and restoring mobility and color to the iris. Atropia in one half or even one quarter grain solutions should be instilled several times a day. The mercury may be administered either externally or internally. A warm bath daily and free action of the bowels will hasten the recovery. Young infants bear mercurials very well, and they may be given alone or in combination with ferruginous tonics and cod-liver oil.

II. CHOROIDITIS.

Doubtless many cases of chorioiditis in syphilitic infants and young children escape notice, on account of existing corneal complications or blocking of the pupillary space by exudation, thus preventing ophthalmoscopic examination.

But we occasionally meet with cases in which the cornea is clear and the pupil free, but in which disease of the deeper tissues of the eye exists. If the child is old enough, dimness of vision is complained of; and here the ophthalmoscope shows diffuse patches of exudation in the chorioid, in which the retina is also involved, and perhaps an exudation in the vitreous. If these cases are followed up carefully, the vitreous is seen to clear up under treatment, and then the chorioidal patches are seen better defined and more circumscribed. The changes are seldom limited to the chorioid, but involve the retina also. The chorioidal disease differs in no respect from the same disease met with in adults and due to acquired syphilis.

Prognosis.—The prognosis is not so favorable as in iritis. These cases recover more slowly, and probably never regain perfect acuity of vision, owing to more or less extensive disorganization of the outer layers of the retina.

Treatment is the same as that pursued in infantile iritis, but it is necessary to persist in this treatment for a longer period, and to depend largely on a general tonic and dietetic management of the case.

V. HYALITIS, OR INFLAMMATION OF THE VITREOUS HUMOR.

Inflammation of the vitreous humor, or pure hyalitis, never occurs alone as a distinct disease in inherited syphilis. The vitreous is apt to be involved in cases of inflammation of the chorioid, and various kinds of opacities are met with. The most frequent are fine, dustlike opacities scattered throughout the vitreous; but we also occasionally meet with membranous opacities, both fixed and floating, which interfere greatly with vision, and are very slow in yielding to treatment. The fixed membranous opacities are probably never absorbed, and unless the fundus is fairly healthy they are not properly subjects for surgical interference.

VI. DISEASE OF THE LENS, OR CATARACT.

In neglected or unrecognized cases of infantile iritis, and in all cases of intra-uterine iritis, the lens tends to become more or less completely opaque. In the former class of cases the opacity of the lens follows slowly, and the development of the cataract may be postponed for several years. They are not at all good cases for surgical interference, owing to disease of the iritis, or chorioid, or both, which coexist or have preceded the development of the cataract. Not much can be expected from discission or needling, and extraction of such opaque lenses is not to be recommended. Local applications and internal medication are of no use in promoting the absorption of such a cataract.

VII. RETINITIS AND OPTIC NEURITIS.

There are but few cases on record of retinitis or neuro-retinitis in children due to inherited syphilis. In chorioiditis the retina is almost certain to be involved in the process, owing to the intimate connection between the outer layer of the retina and the chorioid; and the resulting defective vision is largely due to the disorganization of the layer of rods and cones of the retina by the exudation. Atrophy of the optic nerve as a result of neuritis very probably does occur in the so-called malignant cases of infantile syphilis, but no such case has to my knowledge ever been reported. This is not strange, if we remember that, even in acquired syphilis, neuro-retinitis is relatively a rare constitutional symptom.

Hutchinson (*loc. cit.*, pp. 164 and 167), however, reports two cases of suspected inherited syphilis, in which the margins of the optic disks were not, as is usual in atrophy of the optic nerves, clearly defined, but were indistinct, and hence pointed to a previous stage of actual neuritis. The first case was a semi-idiotic boy of marked syphilitic physiognomy, who was quite blind. In both eyes the optic disks were ill-defined, very white, and with exceedingly minute vessels. The boy's teeth were typically malformed, and he was subsequently attacked by well-marked interstitial keratitis in both eyes. The second case occurred in a boy aged nine, of marked syphilitic physiognomy, with notched and narrow central upper incisors. The blindness had been advancing for some time before it was discovered. In both eyes the optic disk was flat, and bluish-white in color, and the vessels were of exceedingly small size. Only the trunks of the larger arteries and veins were visible, all the smaller ones having entirely disappeared. The margins of the optic disks were ill-defined and ragged.

These cases of atrophy, rare as they are in children, are quite sufficient to awaken our suspicions, and to induce us, when we meet with atrophic changes of the optic nerves in young persons, to make rigid investigations as to the possible existence of inherited syphilitic taint.

VIII. DISEASE OF THE MUSCLES OF THE EYE.

The little sufferers from inherited syphilis are very rarely subject to paralysis of any of the ocular muscles. It is, of course, probable that in iritis and chorioiditis the ciliary muscle should become more or less involved in the process, and the accommodation consequently more or less affected. But the extrinsic muscles of the eyeball, the four recti, and the two oblique, seem to be singularly exempt from paralysis, for we have no record of any such case in young children with other symptoms of inherited syphilis.

IX. DISEASE OF THE ORBITAL WALLS.

Periosteitis of the bones of the orbit, notably of the lachrymal and frontal bone, with or without caries, has been occasionally noted in infantile syphilis, and cases illustrating it have been published. The symptoms in no way differ from those of periosteitis and caries due to acquired syphilis, but fortunately the disease in young children is much more rare. Any such disease of the bone might endanger the integrity of the eyeball through interference with the blood-supply to the eye and optic nerve, caused by infiltration of the surrounding tissues, or by infection of the lymph-channels of the eye by septic material coming from the general or localized suppuration. The prognosis is always unfavorable, and the treatment should be largely surgical, the diseased periosteum being freely incised, free drainage effected, and all dead bone at once removed.

SYPHILIS OF THE EAR.

By J. ORNE GREEN, M. D.

ACQUIRED.

The manifestations of syphilis in the ear are so rare, or at least so often unrecognized, that the experience of any one practitioner offers but a very limited number of observations, and in the following article I have not hesitated to draw freely upon the literature of the subject, endeavoring to weigh the evidence offered, and to present the matter in as connected a form as our existing knowledge appears to justify.

Undoubtedly the disease escapes recognition in the ear more frequently than is supposed, for we are accustomed to confirm our diagnosis of the general disease by a physical examination of the whole body for other symptoms. It is, however, a fact now well established, that the grosser syphilitic lesions—gummata, papules, and condylomata—may appear on the external ear without there being any other manifestations of the disease anywhere on the body at the time; and if this is so, it is highly probable that some of the lesions of the deeper parts of the ear are also occasionally of syphilitic origin, but escape recognition, from the absence of any confirmatory symptoms in other parts. This is probably the case in some of the inflammations of the tympanum and of the temporal bone, and perhaps also of the labyrinth.

Frequency.—In regard to the frequency of syphilitic manifestations in the ear statistics have been published by Deprés, Ravogli, Buck, Schubert, and Ludewig. From these figures it is found that, out of 1,370 syphilitics, thirteen, or 0·95 per cent, showed syphilis of the external ear; also that, out of 7,515 patients suffering from ear-disease, eighty-three, or 1·10 per cent, were subjects also of syphilis; and of these eighty-three syphilitics the causal connection between the ear-disease and the syphilis was almost certain in forty, which gives a percentage of 0·53—i. e., taking these figures as a basis, 0·53 per cent of ear diseases are syphilitic.

I. SYPHILIS OF THE AURICLE.

Chancre.—Chancres of the auricle have been reported by several authors, and offer but little of interest: they were located on the posterior aspect of the auricle, on the tragus, lobule, and mastoid process, and were attributed to kisses, bites, infection of a child by its nurse, etc.

The disease is certainly a rare one, for Mracek (Wiener med. Presse, No. 1, 1880), in a report of four hundred cases of chancres outside of the genital tract, gives but three of primary syphilis of the external ear. Gruber (Wiener med. Presse, Nos. 1, 2, and 6, 1870), who had as his field of observation the enormous material of Hebra's and Von Sigmund's clinics in Vienna, says he had never seen the primary lesion on the ear. Pellizzari (Della transmissione accidentale della sifilida, Mailand, 1882) examined critically forty-one cases of syphilis without coitus, and found no cases of chancre of the ear, but he did find one chancroid of the lobule referred to infection from a towel which had previously been used by another person. Zucker (Archives of Otology, 1884, p. 245) describes one case which, however, he only saw in the healing stage. A man was kissed on the ear, but whether any abrasion existed at the time he was unable to state; four weeks after an excoriation appeared on the tragus, which steadily and gradually enlarged and suppurated. Eight weeks after infection, small, round, scaly efflorescences appeared on the hands; and one week later, when first seen by Zucker, the tragus was of a livid-red color, twice as thick as normal, and its anterior surface covered with a darkly pigmented, radiating cicatrix. The entire parotid region was much swollen, hard but not painful. Beneath the angle of the inferior maxillary was a bunch of separable but indurated and enlarged lymphatic glands. The meatus was nearly closed by swelling of its anterior wall, but without discharge; the deeper parts of the ear were normal in appearance and function. The lymphatics of the neck and axilla were swollen, but with the exception of the hands, as described above, no other symptoms of the disease could be found. A rapid cure followed a course of mercurial inunctions.

Hermet (Maladies de l'oreille, p. 258) describes two cases: one in a man, from a bite on the lobule given by a man who was then suffering from syphilis of the mouth; another in a woman, who, while she had an abrasion behind the ear, was kissed on the spot by her husband, who at the time had mucous patches on the lips. In the first case the syphilitic lesion developed twenty days after the receipt of the injury; in the last case it still existed three months after the kiss. Both were followed by constitutional syphilis, and both were accompanied by enormous ganglionic enlargements in the submaxillary and parotid regions.

Diagnosis.—Judging from the descriptions, the characteristic circumscribed induration of the primary lesion is not to be recognized when the disease occurs on the auricle, but we get a clean-cut ulceration, as though the tissues had been punched out, the base of a dirty-gray color, and accompanied by a great deal of inflammation of all the surrounding tissues. In the cases reported, the lymphatic engorgement was in the submaxillary and parotid regions. From what we know of enlargement of the lymphatics, with other diseases of the ear of an inflammatory nature, it is probable that engorgement from disease of the tragus would appear first just in front of the tragus in the extreme upper parotid region, that from the lobule would show between the angle of the jaw and the mastoid tip, and that from the mastoid region directly over that bone and then just below it.

The disease, either simple or phagedenic, might be confounded with epithelioma of the auricle in certain stages of ulceration, but the one tends to self-cure while the other does not; and, in a very doubtful case, a microscopic examination of a portion of the growth would probably be sufficient to settle the differential diagnosis. The development of general constitutional symptoms would be another means of proving the diagnosis.

The treatment does not differ from that of the same lesion in other parts.

Eruptions.—The ordinary syphilitic eruptions of the skin may appear on the auricle. *Syphilis maculosa*, when it exists on other parts of the body, may appear on the auricle also, and is unimportant. *Syphilis papulosa* is rare on the surface of the auricle, probably on account of the paucity of glands on this portion of the ear, but it is seen occasionally in the concha, and in the posterior angle and on the edges of the lobule. The papules break down sometimes, leaving an ulcer.

Taylor (Rupp, Journal of Cutaneous and Genito-Urinary Diseases, October, 1891) asserts that papular syphilides may appear on the ears, diffuse themselves circumferentially, and produce reddish-brown patches which look like seborrhœic eczema or even psoriasis, this occurring within the first year of infection.

Tubercular syphilides of the auricle are described by Taylor, Burnett, Ravogli, and Sexton, and are of importance from their extent, their tendency to ulcerate, and the possibility of confounding them with other diseases. The most full description of them is given by Taylor (Rupp, *loc. cit.*) as follows: "There is a tubercular syphilide found on the ears which may at first be localized in spots or patches (papules or tubercles), but its lesions do not, as a rule, become sharply limited, and show a tendency to diffuse themselves on the surface. The whole thickness of the skin is involved, and these patches are reddish or brownish in color. In some instances they are scaly, and look like lupus exfoliativus, and in others, when subjected to irritation or in uncleanly persons, become inflamed and exulcerated, and in this condition a sero-purulent exudation occurs on their surfaces which may dry into crusts. In this condition I have seen this syphilide present a marked resemblance to eczema impetiginosum. This lesion runs a chronic course, and usually ends in atrophy or cicatrization. . . . This form may appear precociously in the first year, but by far more frequently in the second year or later."

Burnett (Treatise on the Ear, second edition, p. 222) describes a case which began as a circumscribed, infiltrated lump on the posterior aspect of the auricle. It was slightly elevated above the general surface, was of a deep reddish color, painless and without itching. In about six weeks the infiltration had diffused itself throughout the greater part of the auricle, which was thickened and deformed, and also extended over the mastoid. After some weeks of this condition, softening and ulceration ensued, with an offensive discharge, but without pain.

Sexton (Journal of Cutaneous and Venereal Diseases, June, 1883) reports three cases of tubercular syphilides of the auricle which he regards as a tertiary lesion, and, differing from other observers, thinks it is not liable to ulceration, but that the loss of substance, when it exists, is due to interstitial absorption. From his experience he thinks it is disposed to confine itself to the anterior portion of the pinna.

Ravogli (Second Otological Congress, Milan, 1880) reports a tubercular syphilide which began in the neck, ulcerated, and extended over the auricle into the meatus; the ulceration was deeply excavated and with everted edges.

Further evidence is necessary for us to decide upon the most common seat of the early disease.

Diagnosis.—A differential diagnosis in certain stages of the disease, when the aural lesion was the only one, might be attended with difficulties. Taylor, above quoted, calls attention to its occasional resemblance to impetiginous eczema. A failure of local treatment adapted to that disease and the success of a general constitutional course of medication might be necessary to settle a very doubtful case. In the ulcerated stage the distinction from epithelioma might not be easy. Epithelioma, when it becomes extensively ulcerated, is generally painful; this syphilide is not: the discharge from the former is thin, watery, scanty, and bloody; that of the latter is thick, purulent, abundant and offensive; the ulceration of epithelioma begins at a small spot and spreads peripherally; the tubercular syphilide is apt to break down over an extended surface or in several spots at once. Finally, we have the great test of our diagnosis in so many doubtful cases, the effect of general constitutional remedies. From lupus the disease could be distinguished by the discharge, which is almost wholly absent in lupus-ulceration, and by the absence of the characteristic cicatricial tissue of lupus.

The tubercular disease is apparently one of the later manifestations of syphilis, usually occurring in from one and a half to ten years after infection, and calls for iodide of potassium or that drug combined with mercury.

Antiseptic cleansing when there was discharge would be very necessary, especially so if the lesion was in the neighborhood of the meatus.

The papular and macular varieties belong to the earlier stages and require a general mercurial course without local treatment, except perhaps in the form simulating seborrhœic eczema, when some local applications might be necessary for the removal of the crusts.

Gummata.—Gummatous lesions occasionally appear on the auricle of the ear, and are found on both anterior and posterior surfaces of the cartilaginous portion, and also on the lobule. They may vary in size from a half pea to several times that dimension, are very apt to ulcerate, and the ulceration may extend deeply and involve the cartilage, even producing a necrosis of that tissue.

Rupp (*loc. cit.*) describes one case on the lobule of the ear in a patient who showed signs of the disease in the throat, anus, and face. In order to prove the nature of the swelling, he cut into it, and found the reddish, fatty, glistening appearance of a gumma, without pus, steatomatous material, or marked fibrous surface.

I have myself seen a case recently in a man aged twenty-five, with well-marked squamous eruptions on the body, who within three weeks had noticed small lumps on the auricle, one of which, on the upper part of the concha, had become inflamed and ulcerated. When seen, there were two small, movable, rather soft tumors, size of half a pea, on the posterior surface of the auricle; they were not sensitive, and the tissue over them was perfectly normal. The whole integument of the concha was red, infiltrated, sensitive, and painful, and in the upper part was a round ulcer three sixteenths of an inch in diameter, clean cut, extending well into the corium, and covered with a dirty grayish deposit. The time of original infection could not be learned. The tumors and eruption disappeared within a week under iodide of potassium, and the ulceration cleaned off rapidly and healed.

A most interesting and instructive case is given by Hessler (Archiv für Ohrenheilkunde, xx, 242), of a man twenty-four years old, who for several weeks had noticed an ulcer on the anterior surface of the right auricle which would suppurate for a few days, then heal, then suppurate again. When seen, the whole auricle was bluish-red, swollen, shining, twice as thick as normal, and very sensitive. On the antihelix and concha was an ulcer three millimetres in extent, secreting a yellow adhesive serum, and the meatus was nearly closed by swelling of its walls. The history was one of ulcer on the penis and gonorrhœa, cured by internal and external medicines four years before, and no further symptom of syphilis had been noticed or could be found on the closest examination. Under cauterization the ulcer on the auricle partially healed, but in four months returned again larger than before. The skin was undermined, the cartilage became necrosed over a circumscribed area, and was excised and curetted. Partial healing took place, but the ulceration kept recurring, in spite of appropriate local surgical treatment. Nine months after the first appearance of the ear disease a small spot of periostitis of the tibia developed (the only symptoms of syphilis, except the ear disease, since the patient came under observation), and iodide of potassium was then given, under which the periostitis immediately disappeared, the ear began to heal, and in a few weeks was perfectly well, showing only a retracted and radiating cicatrix at the seat of the ulcer. It then appeared that the patient, two years before, had been treated for chronic swelling of the finger-joints by compress bandages without good result, and some time after that for a gummatous orchitis by iodide of potassium internally with excellent effect.

Diagnosis.—An extremely ulcerated gumma of the auricle might be confounded with an ulcerated epithelioma, but the slow development of the latter, generally months, and often several years, in contradistinction to the rapid growth of the former, would be a prominent characteristic, and in a very doubtful case general medication and a few weeks' time would settle the question.

The disease is undoubtedly one of the later tertiary manifestations, and iodide of potassium is apparently both rapid and effectual in relieving it. Internal medication seems all-sufficient for the cure, but care should be taken that the discharge does not enter the meatus and produce further irritation. For this discharge some cleansing applications should be used —baths of corrosive sublimate, or something similar—and in my own case calomel was dusted on the ulceration with apparently excellent effect.

Ulcers.—But one other form of the disease on the auricle remains to be mentioned. Several observers have reported small ulcers which are undoubtedly syphilitic. They appear singly on the anterior surface of the auricle, are usually of small size, with sharply defined edges and grayish bases, with very little discharge, and apparently with but little tendency to spread extensively; they are not painful, sensitive, or deep. Unless their syphilitic nature is recognized they are very difficult to heal, and may last for months in spite of cauterization and other local treatment. Under what category they should be placed I am not clear. They are found without the presence of either papular, tubercular, or gummatous syphilides in other parts of the skin, but, I think, may be ulcerations of a single nodule of one of these forms. The fact that they heal readily under iodide of potassium would seem to place them among the later symptoms.

Politzer (Lehrbuch der Ohrenheilkunde, ii, 691) reports two such cases: one occurring with otitis media suppurativa chronica, in a patient with syphilis of the larynx; and the other without any deeper ear disease.

Buch reports two cases: one with a syphilitic exanthem of the face and a syphilitic mucous membrane, three and a half years after infection; the other without any extra-aural manifestations. I have myself seen one case where I could find at the time no other syphilitic manifestations. All were readily cured by iodide of potassium internally.

Simple ulcers on the auricle are extremely rare—that is, well-defined ulcerations unattended by other disease of the skin, such as eczema, and their existence would lead to the suspicion of syphilis or epithelioma immediately.

II. SYPHILIS OF THE MEATUS.

One case of *chancre* of the meatus has been described, occurring just at the orifice of the passage; *maculæ* have been described by Urbantschitsch; and *papules* by both Gruber and Acton, the latter asserting that the papules may become so numerous as to close the passage (Rupp, *op. cit.*). None of these manifestations offer anything of special interest. Of course, they are possible, from the presence of skin in this situation, but they must be exceedingly rare not to have been mentioned more frequently.

Lacharière and McBride (Guide to the Study of Ear Diseases, p. 187) speak of an otitis externa diffusa due to syphilis where the walls of the meatus are somewhat swollen, although not so much so as in the phlegmonous form of the disease; the skin is cracked and red, and the discharge offensive. It is referred by them to the secondary stage of the general disease, and may affect one or both of the canals. Whether we are justified, from the imperfect evidence given, in adding an *otitis externa diffusa syphilitica* to our nomenclature, is very doubtful; and it seems more probable that the disease described by these authors is rather the dry papular syphilide mentioned by Taylor as sometimes simulating eczema which has become irritated in some way, perhaps by scratching, or else it is the beginning of condylomata.

Ulcers.—Syphilitic ulcers occasionally occur in the meatus; they have been described both in ears which were bathed in pus from old chronic suppuration of the tympanum and in ears free from any previous disease. Christinneck (Archiv für Ohrenheilkunde, xviii, 288) described one which occurred in a patient several years after infection, and in whom innunction cures had been used several times. There were pain, tenderness, and discharge in both ears, due to superficial, ring-shaped ulcerations, with dirty, whitish bases and thickened edges; these were situated at the junction of the cartilaginous and osseous meatuses. At the time there was ulceration of the nasal septum, with greatly enlarged lymph-glands in the neck and inguinal region, but no other symptoms of syphilis.

Constitutional treatment and painting the ulcers with argentis nitrate effected a cure in three weeks, leaving a ring-shaped cicatricial thickening of the canal.

Jacobsen (Archiv für Ohrenheilkunde, xix, 36) mentions a patient with suppuration of the right tympanum, of three years' duration, in whom there had recently appeared a ring-shaped ulceration at the entrance of the meatus; it had a dirty, grayish-white, adherent deposit, and its edges were greatly swollen. Six months earlier the patient had been infected with syphilis, and at the time of observation showed a syphilitic ulceration of the pharynx.

Skjelderup (Archiv für Ohrenheilkunde, ref., xxvii, 68) describes an oblong ulcer, size of a pea, in the left meatus, which was said to have followed a furuncle. A gradual increase in the ulceration followed a local treatment by mercurial salve and argentis nitrate, and the lymph-glands became infiltrated. As syphilis was denied, and no symptoms of it could be found elsewhere, a diagnosis of rodent ulcer was made, and the part excised with successful result; but three months later nasal and pharyngeal syphilis appeared, and was cured by general medication, rendering it probable that the aural ulceration was syphilitic.

Exostoses, pedunculated and broad-based, are very common in the meatus, and frequently come under the observation of all otologists. By many of the older writers, and by some of the later, they are referred to syphilis, but in my opinion they can not be regarded as manifestations of that disease. I have carefully investigated a great many of them, and have never found one that seemed to me to have a syphilitic origin; and in many of them any syphilitic taint could be denied most positively, both from the statements of the patients and from physical examination. The well-known tendency of syphilis to cause circumscribed periostitis was probably the origin of the theory. It certainly can be asserted that they present nothing pathognomonic of syphilis.

Condylomata.—No one form of syphilis of the ear appears to have been found as often as condylomata of the meatus; they are mentioned by many writers. Of 1,200 syphilitics examined by Deprés (Annales des maladies de l'oreille, 1878, p. 311), 980 showed flat condylomata on different parts of the body, and, of these 980, five showed them in the meatus. Kipp, in 16,000 ear patients, saw condylomata of the meatus in two. In 3,976 ear-patients, Buck found five with condylomata of the ear-passage. I am unable to give actual figures from my own experience, but I have seen them in several cases—perhaps five or six. Rupp (*op. cit.*) found the disease three times in over 4,000 cases of ear disease. They seem to be more frequent in females than males.

The best description of them is given by Stöhr (Archiv für Ohrenkeilkunde, v, 130) from a study of fourteen cases in the hospital at Würzburg. They are most common in the narrowest part of the meatus, and generally appear with the earlier syphilitic manifestations simultaneously with macular and papular eruptions, beginning with a slight swelling of a dirty, bluish-red color, somewhat dotted with desquamation. This swelling and redness increase, a purulent secretion mixes with the cerumen, the spots of deepest red become more pronounced, and from infiltration rise above the surface, making the meatus narrower. A sense of fullness and slight tenderness on pressure is now felt. As the swelling increases the drum membrane may be involved, becoming reddish and dotted with loose epidermis, the dividing line between the drum membrane and the meatus is obliterated, and all the appearances now are those of an otitis externa diffusa. In a few days, with constantly increasing purulent secretion, the condylomata become fully developed, completely closing the meatus, which becomes very red from the corrosive secretion, and excoriated in spots from maceration of the epidermis. The growths assume various forms, sometimes conical, sometimes ragged, according to the mechanical pressure exerted upon them by the contact of the swollen walls.

They show a great tendency to ulceration, greater than in any part of the body except perhaps the genital region, and are often quite deeply excavated; they appear at first as hard papules covered with a white, finely granular, thickened epidermis, which, however, soon desquamates, leaving an exposed corium, either bleeding or crusted; they vary in size from a pin's head to a pea. In exceptional cases they develop without the formation of any purulent secretion, and remain dry.

The condylomata may now undergo an involution and gradually disappear, and the ulceration, if any existed, heal, leaving the meatus smooth, with a loss of the follicular glands and hairs, and showing scars of the ulcerations. Sometimes the cartilaginous meatus is permanently enlarged from the pressure of the growths, and those growths which have not ulcerated leave a pigmented spot for a long time.

The pain is at first inconsiderable, but, as the meatus becomes closed, there is a feeling of fullness, tension, and increased pain, which sometimes becomes very severe; the course of the disease resembles that of otitis externa diffusa, with difficulty of moving the jaw, pain in the head and neck, and occasionally moderate fever. In most cases the disease is unilateral. Deafness is usually due merely to the mechanical closure of the meatus, but occasionally the drum membrane becomes much inflamed, and may even suppurate.

One of the possible results of the disease is permanent contraction of the osseous meatus, due to an organization of the diffuse cellular infiltration of the corium, which always accompanies condylomata; this contraction is generally annular.

Diagnosis.—To distinguish condylomata from the exuberant inflammatory granulations which sometimes result from simple otitis externa, is by no means easy, and sometimes can only be done by the recognition of syphilis on other parts of the body.

Prognosis.—The prognosis is favorable and the cure rapid if the case is seen early; but the relief is slow, sometimes several months, if the condylomata have existed for some weeks, so that marked histological changes have taken place.

Treatment.—The treatment of maculæ and papules requires only the constitutional remedies of early syphilis—mercurial inunctions; the ulcers seem to belong to the later secondary stages, and a mercurial or mixed treatment is indicated, with cauterization of the affected spot by argentis nitrate. In addition to this, I think a moderate local pressure by a pledget of cotton soaked in carbolic oil, or some similar antiseptic oil, will assist absorption of the infiltration, and tend to diminish the annular contraction of the meatus so apt to ensue.

For the condylomata a general antisyphilitic treatment is, of course, of the first importance; but, in addition to this, if the condylomata are of the moist variety, cleanliness, by syringing or douching, is absolutely necessary. In the slighter cases this is sufficient for a cure. If, however, the growths are large, with pain and deafness, local treatment is also advisable. If the growths project very decidedly, parts or the whole may sometimes be snipped off with small scissors, and the remainder often then undergoes rapid involution. Cauterization with argentis nitrate can be used with good effect, the deeper growths being destroyed piecemeal by a bead of the caustic fused on the end of a probe; but, of course, care must be taken not to touch the drum membrane, and the cauterization should not be applied deep enough to give a violent reaction, which will increase the swelling and pain. Pressure will assist the involution, and a conical pledget dipped in dry calomel may be inserted into the meatus and worn for from three to six hours a day and then removed, and replaced the next day. Whatever method is employed, the most careful cleanliness, by syringing or douching, is requisite, a warm (105° Fahr.) solution of corrosive sublimate (1 to 5,000) being used three to six times a day, according to the amount of the discharge, and the ear afterward dried, and powdered with calomel. One possible risk following both excision and cauterization of the growths is adhesion of the raw surfaces thus made; this is very likely to occur if the walls of the meatus are so swollen as to lie in contact, unless prevented by the insertion of a cotton pledget or strip of gauze.

III. SYPHILIS OF THE MEMBRANA TYMPANI.

Eruptions.—The appearance of syphilitic cutaneous eruptions on the drum membrane has been reported in a few instances. Gruber (Wiener med. Presse, 1870, Nos. 1, 3, and 6) reports having seen papules there, which by ulceration produced perforations of the membranes, the disease simulating a simple myringitis. Langé (quoted by Kaposi on Syphilis, 1891) describes a formation like a papule on an inflamed drum membrane in a woman, who showed other symptoms of early syphilis at the time; it was located on the upper segment of the membrane. The small cell infiltration, which often surrounds the seat of a recent perforation in an inflamed drum membrane (the so-called nipple), could be so readily mistaken for a syphilitic papule that one hesitates to accept the imperfect evidence offered by this latter case.

Gummata.—Barratoux (Bulletin et Mémoires de la Société d'Otolg., vol. ii, p. 2) saw in a woman five small gummata on the cheek just in front of the ear, a sixth over the mastoid, three others in the concha and outer meatus, while on the posterior lower quadrant of the drum membrane was a small projecting opalescent tumor, which he considered another gumma In a few days this ulcerated at its apex.

IV. SYPHILIS OF THE TYMPANUM.

In approaching the subject of syphilis of the tympanum one feels that he is opening a field full of suspicions, but in which very little can be said to be proven by accurate pathological investigations. The diseases of the tympanum are almost all diseases of the mucous membrane, of the periosteum, or of the bone, and for all these structures syphilis may be said to have a special affinity. In practice we find all the common diseases of the tympanum occurring in syphilitic subjects, but as yet have no certain means of differentiating between the syphilitic and nonsyphilitic ones, either by the subjective or objective symptoms; and the diagnosis of syphilis of the tympanum often rests on the good results of a general syphilitic medication in curing a disease which had previously proved intractable under a local treatment usually, in simple cases, effective; but even this proof is often imperfect, for general medication may cure the specific lesion in the pharynx which had produced a nonspecific tympanic inflammation, and the cause of the tympanic inflammation being thus removed, recovery from the aural lesion ensues.

The intimate relation of the Eustachian tube to the naso-pharynx would theoretically expose the tympanum to participation in the syphilitic diseases of the naso-pharyngeal mucous membrane; and in practice we actually find, with these naso-pharyngeal manifestations, all three of the forms of tympanic inflammation, viz., otitis catarrhalis secernens, otitis catarrhalis adhæsiva, and otitis media suppurativa. They are undoubtedly produced by the naso-pharyngeal disease; but whether the tympanic disease is in all cases actually syphilitic, can not be stated till the specific microbe of syphilis has been discovered and its presence demonstrated in the tympanic structures.

The proved syphilitic diseases in the naso-pharynx of importance to our subject are:

Ulcerations of the mucous membrane, which occur at the pharyngeal orifice of the Eustachian tube and are accompanied by swelling which closes the tube, and in healing cause enlargement of the orifice of the tube by cicatricial contraction of one of its edges, or close it permanently by cicatricial union of both of its edges (Schwartze, Pathol. Anatomie des Gehörorgans; Steinbrügge, Pathol. Anatomie des Gehörorgans, Berlin, 1891; Loewenberg, Archiv für Ohrenheilkunde, ii, 119).

Sharp condylomata at the orifice of the tube, accompanied by swelling of the tissues, so as to close it (Schwartze).

In addition to these two distinct causes of catarrhal inflammation, Steinbrügge and Moos have found fatty degeneration of the tubal cartilages in a subject of tertiary syphilis.

We know clinically that, accompanying the early syphilitic ulcerations of the pharynx, the mucous membrane of the whole naso-pharynx is often inflamed throughout its whole surface, and secreting a thick, muco-purulent matter very freely. In addition to this, I am convinced we meet clinically with a syphilitic naso-pharyngeal catarrh without ulcerations or new growths. This form has, in my experience, been one of the latest of the secondary manifestations. The mucous membrane of the pharynx and naso-pharynx is of a general deep-red color, œdematous, with all its little folds and irregularities obliterated, and it gives the impression of a membrane deeply infiltrated with cellular growth. It is wholly destitute of ulcerations or prominences.

Of pathological changes in the tympanum itself during syphilis, the existence of secretory catarrh and purulent inflammation with caries and other complications, has been demonstrated by dissections by Schwartze (Archiv für Ohrenheilkunde, iv, 252), Von Troeltsch (Virchow's Archiv, xvii, 19), Betz, and others. Adhesive catarrh has been found by Toynbee (Catalogue of Museum, Royal College of Surgeons, London, No. 512), Schwartze, and Moos (Virchow's Archiv, lxix, p. 313), and the prominent lesion in this disease was anchylosis of the stapes, probably referable to a circumscribed periostitis, as Schwartze has suggested.

Otitis Catarrhalis Secernens, secretory catarrh of the tympanum, is not very uncommon in syphilis. It does not differ essentially from the same disease in healthy persons, so far as the symptoms are concerned, but is rebellious to local treatment alone. It accompanies and is probably produced by the extensive inflammation of the naso-pharynx which is present with the earlier throat symptoms of the general disease. Its chief features are swelling and closure of the Eustachian tube, râles on inflation, slight congestion of the tympanum, and serous or muco-serous tympanic secretion, with deafness somewhat variable in degree and more or less subjective noise.

Treatment.—The ordinary local treatment to the naso-pharynx and ear may produce improvement, but a relapse follows almost immediately, and only when the naso-pharynx has fully recovered under the use of mercury can the ear get well. After the cure of the naso-pharynx the usual local treatment is of service, and sometimes absolutely necessary, to produce absorption of the tympanic secretion, to fully open and clear the Eustachian tube, and to get a full restitution of the tympanic mucous membrane to the delicate condition necessary for perfect mobility of the conducting mechanism.

I have occasionally seen another form of the same disease accompanying what I have spoken of above as the deeply infiltrated mucous membrane of the naso-pharynx. In this variety the secretion both in the naso-pharynx and in the Eustachian tube is very small in quantity, the Eustachian tube obstructed only slightly, the drum membrane much retracted and not returning to its proper position even after strong inflation or after the Eustachian tube is fully opened; the drum membrane itself is often slightly opaque and perhaps a little congested, but no râles are to be heard either in the tympanum or tube. Local treatment will readily remove the slight obstruction of the Eustachian tube so that the air will enter by Valsalva's inflation, but no improvement in the hearing or in the position of the drum membrane will be perceived till the infiltration in both ear and naso-pharynx has disappeared, and this will only take place slowly under constitutional treatment. The disease is, I think, almost wholly a cellular infiltration of the whole mucous membrane of the parts involved—is one of the later secondary manifestations, and best combated by a mixed constitutional treatment under which I have seen perfect recoveries. I have never been able to prove its true pathology, and can only judge of it from its clinical aspects.

Otitis Media Suppurativa.—Suppurative inflammation of the middle ear occurs in syphilitic subjects as the direct result of the syphilitic manifestations in the naso-pharynx, and also from other than syphilitic causes, but in either case the syphilitic dyscrasia is an important and serious complication. What *rôle* the specific germ plays can not be stated, but, judging from clinical experience, it is in this disease an important one. There are, however, no symptoms by which we can distinguish a syphilitic from a non-syphilitic suppuration of the tympanum, although we can suspect syphilis when the aural disease develops during the existence of active syphilitic inflammations of the naso-pharynx. The dangers of extensive ulceration and affections of the bone are much increased in a syphilitic subject.

Treatment.—In this disease, more than in any of the aural affections yet spoken of, local treatment is of as much importance as antisyphilitic medication. Antiseptic cleansing is the important factor, and should be carried out in the methods fully described in the text-books on otology. If this is not done, the maceration of the surrounding tissues by the escaping pus predisposes to the development of condylomata and ulcerations of the meatus, and any closure of that passage, by interfering with drainage, still further endangers the ear and life of the patient. It is impossible in this place to take up all the details of this necessary local treatment. It can only be undertaken by one thoroughly familiar with the use of the otoscope, and with manipulations within the ear and nose. Tympanic suppuration is a serious disease in itself, subject to many and dangerous complications, and the risks are vastly increased when it is complicated by syphilis. This is especially the case when the bone becomes involved; and a mastoiditis in a syphilitic subject is, in my experience, a reason for a most doubtful prognosis.

Internal medication should be adapted to the actual stage of the syphilis, if this can be made out. I think most cases occur during the earlier manifestations, when mercury is indicated; but I have seen it also in one case in the very late stages when there was syphilis of the internal organs. This was a young man with a syphilitic history of many years, and with an enormous enlargement of the liver, presumably syphilitic; the ear disease began as an otitis catarrhalis secernens with serous effusion in the tympanum, without pain and without discoverable disease of the naso-pharynx; this became purulent, and after some weeks developed a mastoiditis with caries, from which he died, apparently from exhaustion. Whatever internal medication is used, the exhausting nature of the tympanic suppuration should be borne in mind, and may require a more tonic and stimulating course of treatment than would otherwise be used.

Otitis Catarrhalis Adhæsiva.—Hyperplastic catarrh of the tympanum is essentially an organization of a fine-cell infiltration of the tissues of the mucous membrane, and I think it can be said that in syphilis there is a strong predisposition to this form of aural disease. It is seen as the secondary result of either of the two preceding inflammations, the mucous membrane covering the conducting mechanism being very much thickened; and it is also found without being preceded by either of these secretory forms of inflammation, coming on insidiously, exactly as the disease does in non-syphilitic subjects, but in syphilitics increasing rapidly and reaching a high degree of deafness. It may be accompanied by involvement of the labyrinth, as shown by diminished bone conduction, or may be entirely tympanic, the labyrinth being normal.

A fine-cell infiltration of the tissues is certainly one of the characteristics of syphilitic disease in many tissues; and when we find a progressive tympanic deafness, with all the symptoms of otitis catarrhalis adhæsiva, as usually seen, coming on in a syphilitic person, but the disease running a much more rapid and vicious course than usual, we are justified in assuming that this cellular infiltration from the general disease is the cause.

A low chronic form of periostitis of the tympanum (Schwartze) probably explains the pathological process, and corresponds with the results of Moos's microscopic investigations.

The few cases of the insidious form of the disease which I have seen have, I think, been in the later stages of syphilis; but the secondary variety following the distinctly secretory affections of the tympanum have developed very soon after the primary tympanic disease, which, as has been said, is often in the earlier stages of syphilis.

Of all the tympanic diseases which have been spoken of this adhesive form is the least amenable to treatment, both local and general. The prognosis for the hearing is very bad; the disease, once established, is likely to go on from bad to worse till useful hearing is lost. The secondary variety offers more hope than the insidious, and the possibility of this adhesive form resulting from either of the other tympanic inflammations should lead to the most thorough treatment, both local and general, of these primary tympanic diseases.

For the various forms of local treatment, reference must again be made to the text-books on the ear. Constitutional treatment adapted to the stage of the general disease should at the same time be pushed energetically.

Neuroses of the Tympanum.—Pain, referred by the patient to the tympanum, without the existence of any signs of congestion, deafness, or subjective noises, is occasionally met with in syphilitics. It occurs with syphilitic ulcerations of the pharynx and larynx, and may be constant, or only produced by the act of swallowing; it is sometimes very severe, and may be the one prominent symptom.

It is probably a reflex neuralgia of the ramus auricularis vagi. It certainly may occur from ulcerations of the epiglottis, probably also from ulcerations of either of the ary-epiglottic ligaments, and perhaps from ulcerations of other parts of the larynx and of the tonsils. The same pain is also sometimes met with in nonsyphilitic ulcerations of these same parts, noticeably in epithelioma. The absence of all signs of congestion in the ear and of deafness, the hoarseness of voice, and the laryngoscopic appearances, give us the diagnosis readily.

The disease occurs in the later secondary or early tertiary stages of syphilis, and is only cured by the healing of the ulcerations by the administration of iodide of potassium. Morphine may be necessary to control the otalgia.

V. SYPHILIS OF THE LABYRINTH.

The anatomical changes in the labyrinth of syphilitics have been described by several writers, but the observations are as yet too few to allow any classification of the different varieties to be made from them alone. Minute dissections have been made by Toynbee (Toynbee's Catalogue, No. 512), Schwartze (Archiv für Ohrenheilkunde, iv, p. 266), Voltolini (Virchow's Archiv, vol. xviii), Moos (Virchow's Archiv, vol. lxix, pp. 314, 315); and Politzer (Archiv für Ohrenheilkunde, xvi, p. 303). These agree singularly in showing anchylosis of the stapes, often extreme in degree; thickening of the tissues of the membranous vestibule and semicircular canals from a fine-cell infiltration, with adhesion of these parts to the periosteum by connective-tissue bands; infiltration of the lamina spiralis membranacea and ossea and Corti's organ with large and small cells. In reading the minute description of the changes found in these cases one is struck by their periostitic character.

Clinical experience, however, has done more to elucidate the syphilitic diseases of the labyrinth than pathological anatomy, and probably most otologists see a considerable number of syphilitic ear diseases which they would agree are characterized by a series of symptoms referable to the labyrinth only. These symptoms are subjective noises of many kinds at once, and usually of a very high pitch, often described as small silver bells or steel rods, or as sudden and momentary clashings; attacks of vertigo, and occasional pain in the depth of the ear; the onset very rapid, usually in one night; the deafness sometimes slight at first, but rapidly increasing for both watch, voice, and tuning fork, but in other cases the deafness extreme almost from the beginning; the bone conduction diminished from the very beginning of the attack, so that the tuning fork on the forehead is heard loudest in the best ear. With these symptoms beginning suddenly there sometimes, but not always, follows, after an interval of days or weeks, a loss of perception of the higher notes, or, as Roosa (Trans. First International Otolog. Congress, 1876) has pointed out, these higher notes, when appreciated, are heard either false or doubled; this sometimes occurs when the hearing for the voice is but little affected. Physical examination wholly fails in these cases to discover any disease of the tympanum. Not only is this series of symptoms almost universally considered clinically to be labyrinthine, but an actual dissection by Moos (Virchow's Archiv, vol. lxix, p. 317) showed the anatomical changes already described above.

For the disease, when associated with the loss or false hearing of the higher notes, Roosa has given the name syphilitic cochlitis—inflammation of the cochlea—as that is the anatomical situation of the nerve-fibers which respond to musical notes. In many cases, however, we get the labyrinthine symptoms spoken of above without any symptoms pointing to the localization of the disease in the cochlea—that is, without the loss or falsifying of the high notes; and inasmuch as the dissections we now possess show not only involvement of the cochlea but also of the membranous vestibule and semicircular canals, and in some cases these latter much more diseased than the cochlea, a more general term than cochlitis seems necessary to express the whole pathological process, which can only be covered by syphilitic labyrinthitis.

In addition to this primary syphilitic labyrinthitis we may have the labyrinth involved secondarily from disease of the tympanum. Voltolini (Virchow's Archiv, xvii) reports the dissection of the ear of a person with secondary syphilis in which, with a secretory tympanic catarrh, hyperæmia of the membranous vestibule, the semicircular canals, and the lower end of the cochlea was found. Clinically, we occasionally see cases beginning as undoubted tympanic disease in which we get later the series of symptoms already spoken of as characteristic of labyrinthine disease.

The primary variety of syphilitic labyrinthitis seems to belong to the later secondary stages of the general disease, the earliest case which I can find coming on some six months after the initial lesion, and others as late as two years after it. When the labyrinthitis is secondary to a tympanic inflammation, however, it may appear much earlier, for, as has been said, some of the tympanic inflammations appear very early in the general disease.

Treatment.—No local treatment of the labyrinthitis is of use, and our whole reliance must be placed on general medication. The prognosis is always doubtful, for the structures of the labyrinth are so exquisitely delicate that a comparatively slight pathological process is apt to injure them permanently. It is, however, by no means hopeless if the case is taken early; and the development of the labyrinthitis should lead to a most energetic treatment by mercury, or by that drug combined with iodide of potassium. Politzer claims good effects in early syphilitic disease of the labyrinth by subcutaneous injections of pilocarpine, and I have seen good effects from this in some cases in diminishing the vertigo and subjective noises quite rapidly. The pilocarpine nitrate was given subcutaneously, beginning, in an adult, with a tenth of a grain, and increasing the dose to one sixth or one fifth of a grain till free perspiration and moderate salivation were produced. This was repeated daily, or every second or third day, according to the strength of the patient, up to ten or twelve injections. The treatment is debilitating, and must not be carried too far. At the same time a mercurial or mixed treatment was also followed.

VI. CONGENITAL SYPHILIS OF THE EXTERNAL OUTER AND MIDDLE EAR.

But little has been written on the manifestations of congenital syphilis in the external and middle ear. My own experience is absolutely nothing. Notwithstanding this absence of reference to the subject, it is scarcely credible that the tympanum should escape becoming involved in the naso-pharyngeal affections of syphilitic children, and one would expect, and, I have no doubt, would meet with otitis catarrhalis secernens and otitis media suppurativa in a very considerable proportion of syphilitic infants, accompanied by the very serious results of those diseases when they occur in broken-down constitutions. In a paper read at the International Medical Congress in Washington, in 1887, Barratoux gave as the result of the dissection of forty-three syphilitic infants—tympanic disease in twenty-seven, labyrinthine disease in four, and both tympanic and labyrinthine disease in twelve. As the paper was devoted to the labyrinthin, no details are given of the condition of the tympana, and the statistics are quoted here merely in support of the supposition that tympanic disease is more common than would be supposed from the little that has been written upon it.

Occasional reference is made in the literature of this subject to syphilitic caries, resulting from or accompanying tympanic inflammations, and, although the true syphilitic character of the caries can not be said to be proved, it is highly probable.

The treatment of these tympanic diseases of congenital syphilis would not differ from that of the same diseases in acquired syphilis.

VII. CONGENITAL SYPHILIS OF THE LABYRINTH.

Deafness, as one of the prominent symptoms of congenital syphilis, has been long recognized clinically. Hinton (Questions of Aural Surgery) describes it; Hutchinson (A Clinical Memoir of Certain Diseases of the Eye and Ear consequent on Inherited Syphilis, London, 1863) makes it one of his triad of symptoms with keratitis interstitialis and notched incisors; Fournier distinguishes it as "surdité profonde," in contradistinction to the secretory tympanic affections accompanying syphilis of the naso-pharynx. It is generally acknowledged that congenital syphilis is the cause of a considerable number of cases of deaf-mutism, and the clinical evidence always places the seat of the pathological changes in the labyrinth.

Comparatively few thorough dissections are at command, but these seem to show the same general changes in the labyrinth which have been already described in speaking of the labyrinthine diseases of acquired syphilis: periostitis of the walls of the vestibule, of the semicircular canals, of the canalis spiralis, and of the cochlea; collections of round cells in the membranous labyrinth, changes in the auditory nerve, and supplantation of the endolymph by a sero-bloody fluid (Barratoux, International Medical Congress, Washington, 1887). Gradenigo (Archiv für Ohrenheilkunde, xxv, 237), in an exhaustive article based upon reported cases and his own dissections, says that the affection begins with an extensive small-cell infiltration throughout the greater part or the whole of the membranous labyrinth, and this is accompanied by a rapidly increasing and often total deafness within a few days. The second phase of the disease, continuing for a long time, is a partial hyperplasia of the connective tissue, and beginning necrosis of the labyrinthine tissues. In the third or last phase, the newly formed connective tissue shrinks and assumes the character of cicatricial fibrous tissue, or is partially changed into bone. This labyrinthitis offers two peculiarities: a very rapid onset and a very slow subsequent course; the patient in a few days becomes almost or totally deaf, and for months or years after is subject to symptoms of an irritative nature, marking the slow progress of the disease. In exceptional cases this labyrinthine disease is followed, after a long time, by inflammation and suppuration of the tympanum with otorrhœa, but what relation this bears to the original labyrinthine periostitis is not clear. Certainly the dissections of the labyrinth we now possess do not seem to show a suppuration of that cavity, the changes being solely of a hyperplastic character, and we are not justified, therefore, in assuming a rupture of pus from the labyrinth into the tympanum.

This labyrinthitis syphilitica may be found at any age from infancy up to twenty years, and perhaps later; it begins, without warning, with continuous subjective noises, at first perhaps a low-pitched roaring, but soon passing into high-pitched musical sounds of small bells, steel rods, or machinery. Deafness is noticed almost from the beginning and rapidly increases—sometimes so rapidly that nearly total deafness will be described as having come on in one night. All local and general symptoms of reaction are wanting, except that sometimes in young children a slight fever is noticed for a few days only; there are no fever, headache, paræsthesias, or vomiting. The perception of high tones is usually lost early. A certain amount of vertigo and disturbances of equilibrium are noticed, usually early in the disease, but sometimes only after several months; they are rarely, however, of a severe character. In case the hearing is not absolutely lost in the beginning, it either fails gradually or is subject to sudden diminutions; and Gradenigo states that, if keratitis exists at the same time, these sudden losses in the hearing are accompanied by increase in the keratitis. In the end, usually all acoustic perception is lost. Inspection of the ear in the early stages shows nothing abnormal; later, the drum membrane may appear opaque and hyperæmic. As a rule, first one ear is attacked and then the other. The disease occurring in a child under six years of age produces deaf-mutism.

Treatment.—Only in the very earliest stage of the labyrinthitis is treatment at all likely to be of use, and even then the chances are very much against success. Unfortunately, with the absence of pain and other alarming symptoms the patient usually fails to appreciate the serious nature of the disease, and is only seen when the disease has already passed its first phase. The indications in the earliest stage of the disease require both an antiphlogistic and antisyphilitic treatment: for the first, leeches over the mastoid and at the orifice of the meatus, according to the strength of the patient, with purgatives, preferably of calomel; for the latter, inunctions and iodide of potassium, or some other form of mixed treatment. Later in the disease the antiphlogistic indication does not exist, and the specific constitutional treatment alone is of use, and may be supplemented or alternated by subcutaneous injections of pilocarpine nitrate (for an adult, one eighth to one sixth grain every other day). The treatment should be followed out for months. Often, in spite of all treatment and notwithstanding occasional improvement, total deafness finally results, but sometimes a modicum of hearing is retained.

HEREDITARY SYPHILIS.

By F. R. STURGIS, M. D.

Definition.—Hereditary syphilis may be divided into the two varieties of congenital and hereditary, the difference being that in the former instance the symptoms are present at birth, in the latter they appear a longer or shorter time afterward. Some writers have considered that there is another variety which they designate as late hereditary syphilis (syphilis hereditaria tarda), in which the symptoms are entirely absent during the earlier period of the child's existence, making their appearance only when the age of puberty is reached; but a careful examination of these cases renders it extremely doubtful whether this view is correct, inasmuch as it is extremely probable that some earlier symptoms have occurred which have escaped notice.

For the purposes of this paper, however, the definition congenital and hereditary syphilis given above may stand, although the former definition is, of course, included in the latter.

HISTORY.

Among the earlier writers on syphilis of the fifteenth and sixteenth centuries, although the existence of syphilis in newborn infants was recognized, its hereditary character seemed not to have been fully understood. Mathiolus (Diday, Syphilis des Nouveau-Nés), in 1536, was the first writer who mentioned the existence of syphilis in newborn infants, but it is questionable whether he is writing of the hereditary and not the acquired type, falling into the same error that Torella, who wrote in 1498, did when he spoke of the fact that in nursing children the first infection appears in the mouth or in the face, and that this occurs in consequence of infection from nursing. Nearly all subsequent writers down to the time of Paracelsus, in 1529, followed in very much the same track, ascribing syphilis rather to poisoning after birth than as a consequence of hereditary transmission. This latter writer was the first who asserted the reality of the hereditary form by stating that in certain cases the disease was hereditary, and transmitted from father to child. He appears, however, to have been alone in his view, for subsequent writers have perpetuated the old mistakes, except perhaps Nicholas Massa, in 1532, who stated that he had seen three children, of the respective ages of three, six, and eleven years, affected with syphilis, and, as he considered that the disease could not have been contracted by either coitus or suckling, he concluded it was hereditary.

In 1553 Brassavola admitted three forms of transmission: First, where the child has been affected by actual contact; second, where it has been suckled by an infected nurse; and, third, where, being infected, it communicates the disease to its nurse. And thus it runs through subsequent writers, some of whom—as, for example, Augier Ferrier, in 1553, and Hascharidus, in 1554—seemed to have a glimmering of the truth, but none of whom was positive about it, ascribing the infection to various causes other than hereditary syphilis, until we reach the time of Fallopius, in 1555, who, after enumerating the various forms of contagion, among them that by the milk, says, "You will see small children born of infected women who suffer for the sins of their parents, and who are born in a semi-cooked condition."

This would seem to indicate that Fallopius had some idea that the disease was conveyable to children by other than the acquired method; but no actual facts are given until Rondelet, in 1560, says, "I have seen a boy born whose body was entirely covered with the pustules of the morbus Gallicus."

Thus we see that up to 1560, with the sole exception perhaps of Paracelsus, most writers upon syphilis have not been perfectly positive as to the existence of the hereditary type of syphilis in children.

It will not be necessary to go further into the historical question of the existence of hereditary syphilis, which has probably been coeval with the acquired form, whether we believe that the acquired form was first introduced into Europe by Columbus, or was generated at the siege of Naples, or existed before either of these two periods.

The next step that we shall consider will be the etiology of hereditary syphilis.

ETIOLOGY.

Infection by the father; the mother being reputed to be healthy, the children are syphilitic.

For a long time it has been a moot point whether syphilis could be conveyed to the child by the father without any infection of the mother, or whether it was necessary that the mother should be infected in order that the child should be diseased, no matter what the condition of the father might be at the time of the conception.

Up to 1854 the opinion was pretty generally accepted that the father, being alone syphilitic, could communicate the disease to the child without the infection of the mother. The cases which have been quoted in support of this theory are, however, so uncertain and so deficient in many important details as to render their value as evidence upon this point of little worth; and it is hardly necessary, in a paper of this description, to quote case after case in support of a theory which I believe is gradually getting to be less and less accepted, particularly as those interested in this subject can study them by consulting the papers by the writer (New York Medical Journal, July, 1871, and July, 1873, Archives of Pediatrics, 1888, and Hereditary Syphilis published by Diday, translated by Mr. Whitley, and annotated by myself). There are two cases, however, which are worthy of extended notice and criticism, because they are so carefully and thoroughly reported by Dr. R. W. Taylor (Archives of Clinical Surgery, September, 1876):

Case No. 1.—On the 20th of September, 1870, a woman brought her infant to my office for treatment. At this interview I obtained from her, in the main, the following history, though some of the facts were elicited and others confirmed at a subsequent time: Her name was Mary F.; she was born in Ireland, twenty-five years of age, and had been married in March, 1861, nearly eleven years previously. She was a descendant of a perfectly healthy family noted for its longevity, and had brothers, sisters, and near of kin who were in perfect health. She had never suffered from sickness during youth or puberty, except certain slight ephemeral affections which left no morbid sequelæ. When married, therefore, she was healthy, robust, and strong. Her husband was then known to be a somewhat delicate man, aged twenty-two, but his wife said he was considered to be in average good health. Of his condition more will be said later.

In February, 1862, one year after marriage, the woman gave birth to a child at full term which was dead. It presented no perceptible lesions, and it was thought it had died a few days before birth, but no cause could be assigned for its death. During gestation the health of the mother was good, and she did not observe any skin trouble.

In February, 1863, she gave birth to another child, which lived until its sixth week and then died of wasting and exhaustion. During its life it was afflicted with condylomata of the anus, roseola, and a papular eruption which also invaded the palms of the hand and soles of the feet.

In June, 1864, she had another child, a boy, which died when five weeks old, having the same eruption and general conditions of the last ones.

In July, 1865, she had a girl which, having broken out with a general eruption similar to that of the others, died of marasmus when four weeks old.

In July, 1866, she gave birth to another girl, seemingly healthy, who when a month old became sick, weakly, and covered with an eruption. It lived three and a half months, and died of weakness (mother's expression). It is said to have had a senile look.

In 1867 (either in July or August) she became the mother of still another girl, which was at birth healthy, and has remained in that state without presenting any lesion which would cause a suspicion of her being syphilitic.

In August, 1870, not having been pregnant since the birth of the last girl, in 1867, she was delivered of an apparently healthy girl. Shortly after its birth this child became sick, and covered with an eruption.

During a very careful examination I satisfied myself that the child was the

During this time his wife brought into the world a child which lived, and which never presented any signs of syphilis. He then gave up medicine, and did not take any for some years, when, in 1869 and 1870, he began to experience his pains again. During this time he impregnated his wife, and she bore the syphilitic child which she brought to me. Examined by me, I found a man of medium size, of good frame, thin and pale; all the ganglia of the body were still enlarged, though he was in the ninth year of syphilis. On the skin were a number of cicatrices. Urged by me, he again underwent mixed treatment for fully eight months, during which time his wife conceived and bore a child which was perfectly healthy, while he himself was restored to health. I was careful that the wife did not take any mercurial. I gave her iron and quinine.

Presented in brief, these facts are as follows: A man with early syphilis impregnates a healthy woman. She, showing no evidence of the disease, brings to the world first a dead child, probably syphilitic; then five undoubted syphilitic children. During this period the syphilis of the father is in an evidently active condition. Then, under treatment, he is seemingly free from his disease. His wife at this time bears a child who is free from syphilis, and remains so. His disease being uninfluenced by treatment, it again develops, its power of contagion returning, and then the wife becoming pregnant, has another intensely syphilitic child. Being again treated, and apparently cured, he again impregnates his wife, and she then bears a healthy child, which within a year shows no evidence of syphilis.

Case No. 2.—A healthy woman was married to a healthy man in 1862. In the three years following she gave birth to three children, upon whom she never saw any skin affections, and who, in short, were perfectly healthy. In 1866 she had a boy, who soon became sick, puny, and covered with a skin disease. The history of anal condylomata and ozena was clearly made out.

In the latter part of 1869 she had a girl, who soon became sick in the same manner as the boy.

When the child was four months old it was brought by its mother to the surgical clinic of Prof. Willard Parker. At this time it had a squamous, coppery eruption around the mouth, and a roseolous and papular eruption on the body and soles of the feet. It also presented a typical, senile facies. The mother also brought the boy just mentioned with her, he having interstitial keratitis, Hutchinson's teeth, and umbilical hernia. She desired treatment for the latter affection. The cases were placed under my care and treated with mercurials. These two children were undoubtedly syphilitic. The history of the older child was examined into carefully, and the fact of the appearance of secondary manifestations soon after birth was clearly made out. The mother was in blooming health, and the most careful examination failed to reveal any suspicion of being syphilitic. I may here repeat that from this time, for a period of seven years, until 1875, and though repeatedly examined, never could I find any evidence of syphilis. Indeed, I am firm in my opinion that she was not syphilitic, nor had she ever been.

In the early part of 1869 she had another girl, which she brought to me when two months old, covered with a roseola and having mucous patches in its mouth. There were, besides, two condylomata on the anus.

The vulva was eczematous. The child had begun to pine, and its skin was thin and dry. The mother was in excellent health, and, as I have said in my general remarks, presented no evidence of syphilis after this child's birth.

A few weeks after this consultation, which was in May, 1869, the husband came to me for treatment with a gummatous inflammation over the left eyebrow. His history was as follows: In 1865 he became syphilitic, having a chancre which destroyed part of the prepuce. This was soon followed by a general eruption on the scalp and upon the body. He also had much trouble with his throat. He was treated only for a period of six weeks, when he regarded himself as cured. From that time until my examination he had had slight evidence of his disease, and being a man of irregular and careless habits he did not apply for treatment. The lesions were scattered papules upon the body and also upon the elbows and knees.

It is probable that he would not have sought my advice but for the unsightly appearance of the eruption on the forehead, and pain experienced by the pressure of his hat. To be brief, he was kept under treatment by me, having impressed him with the necessity of it for several months.

In 1872 his wife gave birth to a child which I did not see until it was more than four months old. His mother was absent in a distant town at his birth, and remained there for some months. She said she never saw any indication of disease in this infant, and her mother pronounced it one of the healthiest children she had ever seen. I could not find any evidence of syphilis, past or present, and my belief is that it was not syphilitic. The mother was watchful and solicitous about the child, and her experience with three syphilitic children was such that her evidence of the child's perfect health may be received without question.

The further history of the woman is that, following a cold six years after the birth of the first syphilitic child, phthisis developed and she died within a year, never having developed any syphilitic lesion.

The facts pertinent to the present issue in the case are very simple and clear. Two parents have three healthy children. Then the father became syphilitic, and in the first year of his disease his wife gives birth to a syphilitic child.

His disease is moderately severe and not properly treated, and in three years again his wife bears a tainted child. During this period the wife is perfectly healthy. In 1869 she brought forth another syphilitic child, and with the exception of a slight anæmia, did not show any deviation from the normal standard of health. Again, in 1872, she had another healthy child.

Let us now look at the father's history. He was healthy until 1863, prior to which his wife had the three healthy children. In that year he became syphilitic and was only indifferently treated. Within a year his wife gave birth to the first syphilitic child. From that time for several years onward he had only mild evidences of syphilis, for which no treatment was followed. While he was thus in the power of the syphilitic diathesis, his wife bore a second syphilitic child in 1866. His being a case in which syphilis took firm root in his organism, that diathesis remained active.

Thus we find he shows slight evidences of the power, and his wife again, in 1869, brings into the world an unmistakably syphilitic child. Then, his disease having been influenced by treatment in about two years, his wife again bears a child without blemish.

Both of these cases are remarkable, not only for the thoroughness with which the infant's symptoms are detailed, but for the careful manner in which the history of both father and mother is given, and the length of time in which both of them have been followed out since they first came under Dr. Taylor's care.

But now let us look at a few points with regard to both of these cases. In the first one, the mere fact that the woman, even after a most "rigid examination," shows no evidence of "syphilis, past or present," can not be admitted as evidence that the woman really did not have syphilis, when we call to mind the cases recorded by Keyes in his work on Venereal Diseases, which is referred to on page 612; by Grefsberg in the Vierteljahresschrift für Dermatologie, etc., for 1879, referred to on page 613; by Lewin, in the Wiener Medizinische Presse for 1876, referred to on page 613; and by Barthelemy in the Annales de Dermatologie et de Syphiligraphie for 1889, referred to on page 613, where women known to have been syphilitic, remained entirely free from syphilis, one for three years, the second for thirteen and a half, the third for seventeen (?), and the fourth for fourteen years, and yet continually gave birth to syphilitic children. The strong point in these cases of Taylor is that, when the father followed treatment the mother gave birth to perfectly healthy children, and when the father suspended his treatment the children again became diseased. This certainly would seem strong confirmatory proof of the fact that the father was the sole cause of the disease; but, on the other hand, it must be borne in mind that trustworthy observers have remarked that in cases where the child was born syphilitic, the father either manifesting signs of syphilis or admitting its previous existence, while the mother herself has never exhibited any symptoms of the disease, children have been born diseased when the father alone has been treated, but when the mother has been treated the child has been born healthy. In this connection allow me to quote a case from Mr. Langston Parker, taken from his book on The Mercurial Vapor Bath, page 43:

> A young lady married with all the prospects of future happiness that fortune and apparent health could give. In due course the lady became pregnant, but miscarried. The same things happened in her second and third pregnancy. A good deal of mental uneasiness was produced, and some suspicions arose. The fourth child was born living, but at six weeks old had snuffling, and the eyes became bad; condylomata also appeared about the anus. A neighboring physician of great local eminence was consulted, who said rather abruptly, "The child is diseased." The parents, as may naturally be supposed, were shocked and horrified beyond measure, the father having, at a remote period before his marriage, been affected with syphilis, but the mother had never exhibited the least symptoms of the disease.
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> He was put upon a course of blue pill and iodide of potassium.
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> The mother at first was not treated. A fifth child was born, and at the end of the first month had symptoms of syphilis. The father was again only treated, and a sixth child was again born diseased. The mother was again examined, but no trace of the disease could be found in the throat, vagina, uterus, or elsewhere. The patients were now placed under my care. I recom-

mended that both should be treated by a full course of mercurial vapor, and that no intercourse should take place during that period. The seventh child was born healthy and has remained so, and neither father nor mother has as yet exhibited any further symptoms of the disease.

As regards the point of the woman bearing some children which were syphilitic and others which were not, it must be remembered that the syphilitic diathesis is not always active in the diseased person; periods occur in which the patient seems to be incapable of conveying syphilis. This is as true of women as of men. The explanation in Dr. Taylor's cases is simply that some of the children were born during this period of repose in the woman, and that the father's treatment probably had nothing to do with the immunity of the children.

There is one singular fact in these cases that, notwithstanding the evidently syphilitic symptoms in the children, the mothers are not infected, and it is to be regretted that Caspary's experiment, narrated on page 615, was not tried in these cases.

Another case is that of M. Fournier (Die Vererbung der Syphilis im vernehmen mit dem Verfasser. Bearbeitet von Dr. Ernest Finger, 1892):

> Fifteen years ago I met by chance an old college mate whom I had not seen for a long time. We talked of this and that, and my friend recounted his experiences and misfortunes. "I am all broken up," he said; "my wife has just had a fourth miscarriage after several months of pregnancy, and what puzzles me is, that all her miscarriages are produced without cause, injury, or imprudence on her part. So far as I can see, my wife is a large, strong, well-built, healthy woman; and in spite of this all I foresee, to my very great misfortune, that I am never to have any living children." The thought suddenly struck me, and I answered: "Perhaps your wife is not so much responsible as you are for these successive miscarriages. I remember many years ago, when we lived in the Quartier Latin, that you had a very fine pox, which it seemed to me you did not particularly take care of. If I were in your place I should treat myself—take mercury and the iodide of potassium." This piece of advice was given in the street, as we were walking; it was followed, and the specific treatment was taken at once and earnestly. Fifteen months later my friend's wife was brought to bed, at term, with a living child, of the age to-day of twelve years. Since that time she has had three other pregnancies, which terminated no less fortunately.

Unluckily, this case loses its value as proof, because, first, there is no proof that the woman was not syphilitic; and, second, there is no proof that the woman was not subjected to mercurial treatment by her husband.

Now let us look at the reverse of this picture. Let us examine those cases where the father is syphilitic and the mother really free from syphilis, and see what happens to the children.

In 1854, Cullerier the younger read a paper before the Société de Chirurgie de Paris upon the question of the paternal transmission of syphilis through the semen to the child, and, after giving many cases, he stated as his opinion that such influence was negative. In other words, in order that the child should be syphilitic the mother must have been infected with syphilis at some period prior to the child's birth; and in his paper he gives several instances in which, while the father was undoubtedly syphilitic, the mother was apparently healthy, and the children were not only born healthy but remained healthy for several years after birth. This view was strenuously opposed by most syphilographers at the time, and it was not until 1860 that M. Notta, of Paris, read a paper upon the same subject, giving in detail eight cases where the fathers had syphilis, the mothers were exempt, and the children all escaped infection.

M. Charrier published (Archives Générales de Médecine, 1862) the history of four cases of paternal syphilis where neither the wives nor the children suffered. This was followed in 1867 by an essay by Mireur, of Paris, confirmatory of the views of Cullerier as to the nullity of the influence which the father's syphilis plays in producing syphilis in the offspring without a concomitant disease in the mother.

Oewre, of Christiania, gives the result of fifty-three fathers who are all syphilitic. They have among them ninety-seven children, none of whom show any signs of syphilis.

Dr. Parry, of Philadelphia, published two similar cases (Philadelphia Medical Times, 1872), and in 1873 M. Langlebert gives the history of two cases in which, notwithstanding marked paternal syphilis, the mother and children both escaped.

These cases would all tend to show that, notwithstanding the fact of the father's syphilitic condition, the children themselves escaped infection provided that the mother is also exempt from syphilis; in other words, that the semen is not capable of directly conveying the disease, as is proved by Mireur's experiments on inoculation of syphilitic semen.

Infection of the mother through the fœtus by conception.

This method of transmission was at one time invoked in order to explain those cases in which the child, evidently diseased, was either born of a mother who was free from all symptoms of syphilis, but who could not be inoculated by her child, or in those instances in which the mother showed some traces of syphilis after the birth of her child, but none preceding it.

As this question really hinges upon the point, already discussed, whether syphilis can be transmitted by the father alone, without the participation of the mother in the infection, I shall not dwell longer upon this point, but shall pass to the consideration of the next subject.

Cases where the father is diseased, the mother apparently healthy, children diseased, and yet, from previous knowledge of the mother, it is evident that she has been syphilitic before, although showing no evidences of the disease.

The first case is taken from Keyes's work, Venereal Diseases, and runs as follows:

> A woman has had under my observation three children, all syphilitic. The first child was a few months old when I first saw it. It was sent to me for treatment, with the statement that it had been born healthy, had been poisoned by its wet nurse, and in time had poisoned its father. The child and its father manifestly syphilitic.
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> The mother thought she was sound, and would have passed for being well, except for a very thorough examination, which detected an occasional suspicious-looking macule on the skin, and some small but beautifully characteristic mucous patches upon the throat and inside of the mouth. All three were treated. The baby died. The mother lost her symptoms at once, and considered herself so well that she refused treatment. The father's symptoms continued, and were severe.
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> After a time the wife again became pregnant in another city. A child was born, apparently healthy.
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> The mother was a picture of perfect health, and considered herself well; the father was still under treatment. The baby was pronounced healthy by the doctor in attendance, and given to a wet nurse.
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> The nurse soon got a sore on the nipple, then a sore was found on the baby's mouth, and both nurse and child commenced to give evidences of the syphilitic poison by eruptions. On this account the nurse was accused of having poisoned the child with syphilis, and was discharged. The child's mouth was treated, another nurse was sought, accepted the place, and after a few weeks the family again came to New York. The mother seemed to be in the perfection of health, and no trace of syphilis existed upon her.
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> The child, now about eight months old, looked like an old man; the head was small, the fontanelle nearly closed, the body wasted, the voice hoarse, while a large fungoid ulcer occupied the corner of the mouth. The father had white patches on the tongue, and squamous, serpiginous spots on the scrotum.
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> The new nurse was pale, had one raw, hard, beefy-looking ulcer on the nipple and breast about one inch long and a half inch wide. She was feverish, sore throat was commencing, with pains in the bones at night. Nurse and baby were put under treatment. The former continued to have a few mild symptoms of syphilis while under observation (six months). The child's symptoms disappeared under treatment.
>
> Finally, the mother became pregnant again. She seemed to be perfectly well, but I urged her to take treatment continually during the term of utero-gestation. This she failed to do efficiently, because she enjoyed, seemingly, the absolute perfection of health and looked perfectly well. At the end of the eighth month, without cause, the child's movements in the womb ceased. At term, February, 1879, she was delivered of a dead child, the macerated condition of the latter showing that it had been dead for some time. In August, 1879, I saw the mother. She had taken no treatment, but showed no signs of syphilis.

The case is very instructive. Had I not seen the mother before the death of her first child, I should have felt certain that she had no syphilis, for from that date until this writing, now a period of more than three years, she has not shown the least symptom of syphilis, except by the fact that she has produced two syphilitic children.

Grefsberg (Vierteljahresschrift für Dermatologie for 1879) gives a case which is full of interest as bearing upon this point. A woman in 1864 contracted an indurated chancre. In the two following years she had several attacks of secondary symptoms, which necessitated a series of mercurial treatments, and for which she was kept two hundred and ninety-two days in the hospital. In 1867 she married a man who was not syphilitic, and in the space of ten years she had eleven miscarriages. At the twelfth pregnancy, thirteen and a half years after the initial lesion, she went to full term and was delivered of a child which presented indubitable signs of syphilis.

During this period of eleven years she had not infected her husband, nor had she herself seen any symptoms which could be referred to her old syphilis.

Lewin (Wiener Medizinische Presse, 1876) gives the history of a woman who, contracting syphilis from a nursling, conveyed the disease to her husband and her own child. The man died from brain syphilis, and the woman later on married again. Seventeen years after contracting her disease, and being for many years previously and at the time of her second marriage apparently well of her disease, she had two children. One died at the age of five and a half months from congenital syphilis, and the other, which up to the age of six years (?) had been free from any symptoms of syphilis, broke out with a syphilitic eruption, which yielded to mercury. At the time of reporting this case the child was fifteen years old.

In this same connection it is worthy of note that the child by the first marriage, which acquired its syphilis, was cured by mercury, married, and later on had a syphilitic child.

Barthelemy (Annales de Dermatologie et de Syphiligraphie, 1889) reports the case of a child, aged four months, which was covered with a papular and a papulo-crustaceous syphilide, some of the lesions of which were ulcerated and some were hypertrophic. The eruption was very abundant, and yet the child was in a very good general state of health. There were no osseous lesions, and no appreciable visceral lesions, nor any subcutaneous gummata. The child was born at term, was fat, and normally developed. The first symptoms appeared when the child was three months old, and there was no evidence whatever of a primary lesion. Barthelemy reported it as a curious instance of hereditary syphilis, in which the parents had contracted the disease fourteen years previous to the birth of the child, but where neither parent showed, at the time of the child's conception, any symptoms whatever of syphilis. The history of the parents is briefly as follows:

Married for eighteen years. They both contracted syphilis four years after the marriage. Mother was treated at the Lourcine, and the father at the Midi. The treatment seems to have been very short, and irregularly carried on.

The syphilis in these two persons ran a benign course, and for a long time neither of them showed any syphilitic symptoms. For three years after their syphilitic manifestations they had no children. Then a daughter was born, which died of meningitis at the age of seven years, after twenty-one days of illness. (No further history of this child is given.) A second child, date of birth unknown, died seven months after birth with pustules.

A third one, date of birth also unknown, died at nine months of age while nursing, it was said, of cholera infantilis. The fourth child, date of birth also unknown, died of broncho-pneumonia twenty-five days after birth. The fifth, date of birth unknown, three days after its birth showed interstitial keratitis of the left eye. It is living, three years of age; is small, weazened, of small stature, according to father's statement, but is lively, intelligent, and in fairly good health. It carries upon its person no trace whatever of syphilis, although I believe him to have been syphilitic from the lesion which he had upon his eye, and from the fact that not once but several times he had been in the habit of kissing his brother, who has large and extensive exudating syphilides upon the face, chin, nose, and especially about the lips. This child is the one which you see about four months and a half old, and which has had very serious lesions for a month and a half. The syphilis is unquestioned. It is very marked, so far as the cutaneous lesions are concerned, but benign in the point of view of its general effect upon the system. This syphilis I do not consider as acquired. It is hereditary, and comes not from the father alone (who is not the sole cause of contagion), but from parents both of whom are syphilitic; and I believe that the syphilis was capable of being transmitted by heredity after a period of fourteen years at least.

In view of these cases—and, if space permitted, others could be given—the apparently healthy condition of the mother must be held as no proof that she is really free from syphilis, for it is clear that a woman may go for years seemingly well and yet be syphilitic. The only way to decide the question—that is, whether the mother is really exempt from syphilis—is to inoculate her with the secretion of a syphilitic lesion capable of conveying the disease.

This is precisely what has been done by Caspary, of Berlin; but, before giving his experiment, let me call attention to and comment upon a law which has become famous in its bearing upon the singular fact that a syphilitic child can not seemingly infect its mother, even when she is to all outward signs free from syphilis, and has never been diseased; while to all others, who are brought into equally intimate contact with the child, it becomes a source of great danger.

This law is known among the continental surgeons as Baumés's law, but among the English-speaking ones as

Colles's Law.—Colles, in his work (Practical Observations on the Venereal Disease, London, 1837), makes the following statements:

"The following fact appears to me very deserving of notice. I have never seen nor heard of a single instance in which a syphilitic infant (although its mouth be ulcerated), suckled by its own mother, had produced ulcerations of her breasts; whereas very few instances have occurred where a syphilitic infant had not infected a strange hired wet nurse, and who had been previously in good health.

"It is a curious fact that I have never witnessed nor ever heard of an instance in which a child, deriving the infection of syphilis from its parents, has caused an ulceration in the breast of its mother."

It is this peculiarity which has rendered it exceedingly probable that in these cases the mother, giving birth to a syphilitic child, although herself apparently free from syphilis, is not really but only apparently so, inasmuch as, were she actually free from disease, she would be as liable to infection from the child's pox as others who are inoculated when brought under conditions where the child is capable of conveying syphilis. In order to settle this point definitely, Caspary, in 1875, published an article in the Vierteljahresschrift für Dermatologie, under the heading, Upon the Healthy Mothers of Syphilitic Children, in which he gives the following case:

A married man acquired syphilis in 1872. During the period of his acute symptoms he abstained from sexual intercourse with his wife, but upon their subsidence he resumed coitus. The woman showed no outward manifestations of syphilis, and was never treated for this disease. In October, 1874, she became pregnant. She had already borne several children, the condition of whom was not mentioned, and about three months later had recurrent uterine hæmorrhages. Early in March, 1875, she was examined, and at the fornix vaginæ a small, hard, circumscribed body was found. (Caspary does not explain what this body was.) A few weeks later the woman aborted, and examination of the fœtus showed a gummous infiltration of the maternal portion of the placenta.

The woman recovered from childbed without any bad symptoms or evidences of syphilis. Caspary, in order to satisfy himself if the woman was the subject of latent syphilis, persuaded her to be inoculated with the secretion of an active syphilitic lesion. This was accordingly done in four places, with the secretion taken from mucous patches mixed with blood of a man who was suffering with the eruptive stage of early syphilis and had received no treatment. The result was negative, and after waiting for six weeks the woman was put upon mercurial treatment, on the ground that the failure to be inoculated showed her to be suffering from a latent syphilis.

This case just detailed, taken in conjunction with the instances already given where the mother, although apparently free from syphilis, is yet proved to have suffered from the disease, and remembering Colles's law, deprives the adherents of the belief that the father alone can be the source of the child's syphilis of one of their most powerful arguments in favor of their theory; for, no matter how carefully the mother may be examined, no matter how positively convinced they may be that the woman is free from syphilis, the question may fairly be asked them: How do you know that the woman has not really had syphilis years before, and that it is still latent? Nothing that you can possibly show will disprove it, and all your statements about the woman's freedom from syphilis goes for absolutely nothing. The fact that treatment on the man's part produces healthy children occasionally, even if you are positive that the woman has not also had treatment without your knowledge, is worthless. Abundant cases exist in the literature of syphilis as trustworthy as your own, which show that treatment on the man's side is nugatory unless the woman is also included, and because at the time of the child's birth the woman may have been—probably was—in that condition known as "repose," where syphilis is not likely to be transmitted. Your belief we can not share, therefore, unless, by inoculation of the woman with the active and inoculable secretions of syphilis, you can prove that you have conveyed syphilis to her.

This is believed to have been done, and the details of the case I herewith record under the heading,

Can a baby, the subject of congenital syphilis, infect its mother, who is apparently free from the disease?

This question comes up as a direct contradiction of Colles's law which we have quoted above, to wit, that a syphilitic child, born of a mother who is without any obvious venereal symptoms at or subsequent to the child's birth, does not convey the disease to her, although it will infect the most healthy nurse, were this latter to suckle it or be brought into the intimate relations which usually exist between mother and child.

The case reported by Ranke, and quoted by Behrens (Berliner klinische Wochenschrift, 1878) is briefly as follows:

> A man thirty years of age was infected eleven years before his marriage, but for nine years previously had been entirely free from any symptoms. Three years before the history was recorded he married, and in the first year of married life his wife, presumably free from syphilis, gave birth to a syphilitic child, which was cured by the repeated use of calomel. (The child's symptoms are not given.)
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> The second child was born during the second year of marriage, and at the end of the second week broke out with a macular syphilide, and with syphilitic ulcerations of the mouth. While the mother was suckling this child an "exquisite" hard chancre appeared upon her left nipple followed by a roseola, which was cured by inunctions of mercurial ointment. Neither the husband nor the first child had shown any syphilitic manifestations since their original attacks. The milk had not been drawn off by a third person.

A most extraordinary case, and, so far as I know, unique in the literature of syphilis. If we accept it—and I suppose it must be admitted until it is shown to be incorrect—we must suspend judgment upon the truth of Colles's law, which we have hitherto accepted, and admit that it may be possible that a diseased child can infect its sound mother; and, if that be accepted, we are forced to admit, as a corollary, that a healthy woman, one free from syphilis, can give birth to a syphilitic child.

But we must also remember that one case, exceptional to all evidence bearing upon a given subject, can not be admitted as positive evidence until it has been supported by other and undoubted proof, particularly when we consider the liability of error upon any single observer's part. If the lesion upon the mother's breast really was an "exquisite" hard chancre, and what followed was a syphilitic "roseola," the question yet remains whether the child gave its mother her disease; indeed, whether the child's malady was not one of those instances of pseudo-syphilis, an admirable example of which is reported by Besnier (Bulletin Médicale, 1887), and which will be found *in extenso* on page 640.

I am free to confess that I believe the woman's lesion was in all probability syphilis, but that the child was not syphilitic, and did not infect its mother; her disease came from some other source, and I am the more confirmed in this view because I do not believe that a man can be free from all manifestations of syphilis for nine years, infect his unborn child without infecting the mother, and that later on this latter falls a victim through the medium of her child, when she herself has had a previous syphilitic one. This is paternal infection run mad with a vengeance, and, to my mind, is as absurd as the stories of mediæval miracles which we read of in history. Still, it is the unexpected which always happens, and syphilis, as we all know, plays most unexpected pranks.

Scarenzio's case is also a very peculiar one:

> A girl nineteen years of age, in December, 1874, marries a man who, while in the army, had "a sore and nonsuppurating glands," which healed under simple dressing. No traces of his trouble remained at the time of his marriage, nor have any symptoms of disease occurred since. The woman became pregnant, and, without having at any time perceived the appearance of any syphilitic phenomena, in September, 1875, she gave birth to a very weakly boy, who was born with a reddened skin, and so feeble as to be hardly able to take the breast. When a month and a half old it became jaundiced, and developed a blennorrhagic conjunctivitis that nearly deprived it of sight. The redness became more intense from the inferior half of the belly to the superior half of the thighs, and in this area there were scattered pustules. In the seventh month of its life, the child never having been nursed by any other person but its mother, and this latter never having given her breast to any other child, the infant was afflicted with drooling, together with sores at the angles of the mouth. Associated with this condition of affairs in the child, an ulceration, attended by marked induration, appeared at the lower and outer part of the nipple of the right breast of the woman, together with an indurated adenitis in the corresponding axilla, followed later on by a lichenoid eruption on both forearms. The woman went to the clinic of Prof. Quaglino, and he sent her to me on the 13th of May, 1876. The baby, fourteen days later, died of marasmus.

The mother showed upon her breasts a papule with a proliferated base; she had sore throat, and the lichenoid eruption of the skin noted above. She remained under treatment for thirty-eight days; all the phenomena then disappeared under two subcutaneous injections of calomel of ten centigrammes each.

The woman became pregnant a second time, and in July, 1877, gave birth to another boy, who shortly after birth was afflicted with a pustular syphilide. The mother was attended by her family physician, who treated her with four successive subcutaneous injections of calomel and the internal administration of potassium iodide. This was given because she had a recurrence of her sore throat, and the ulceration of the nipple had returned.

The treatment was followed by good results, no further symptoms appearing until November, 1879, at which time, suffering from leucorrhœa, she returned to the clinic. There were no symptoms of her previous trouble except an indurated gland in the right axilla. The leucorrhœa was caused by a granular condition of the cervix. She was again put on mercurial and iodic treatment, in the belief that as long as there was any glandular induration there was danger of a relapse.

Since that time there is no further report of the woman. Here, also, we may apply the same criticism that was used in Franke's case. From the history, which is very vague, I think the question of the first child's syphilis is open to grave doubt; indeed, I do not believe it was syphilitic. The mother was, I think, syphilitic, but not until after the first child's birth, and then not from her child, but from some other source outside of the infant. Be the cause what it may, these two cases are very curious and interesting ones, but must be supported by better reported and more convincing cases before the statement can be accepted that a woman, although showing no signs of syphilis, can have a syphilitic child and then be infected by her offspring.

Up to what Period of Pregnancy may a Woman become syphilitic and the Child yet escape Infection?—In 1847, Ricord enunciated the belief that until the sixth month the mother may transmit constitutional syphilis acquired during gestation ; but if the infection of the mother take place during the last three months, it is not certain that transmission is possible. Up to a few years this opinion of Ricord was accepted without question, but lately cases have been recorded which makes it highly probable that the mother can show signs of syphilis as late as the eighth month of pregnancy, and transmit the disease to her fœtus.

Syphilis conveyed from husband to wife at the eighth month of wife's pregnancy.

The case, that of M. Chabalier, is quoted by Durac (Thèse de Montpelier, De l'Heredité de la Syphilis):

On the 5th of October Madame X. consulted me for an affection of the vulva, which at a glance I recognized as indurated chancres.

There were three: one on each labium minus, and a third one dividing the clitoris. They were very irregular in shape, slightly oblong, with circumscribed and smooth borders of the color of ham, not worm-eaten nor burrowing, and on a level with the surrounding mucous membrane. They were accompanied with bilateral, inguinal adenitis, which left no doubt as to the diagnosis. They were, in fact, three typical, indurated chancres. I gave the woman my opinion which came upon her like a thunderclap.

She was a married woman; her husband, absent for five months in traveling, had only passed one day with her, on the 18th of August, and it was to this period only that Mme. X. could ascribe the cause of her disease. She now remembered that among her husband's baggage were some lint and a bottle, the value of which she was now able to explain.

I instituted a purely local treatment with powdered calomel; and some days later, seeing that cicatrization had not commenced, I ordered forty pills of the protoiodide of mercury, beginning with two each day. Twenty pills were taken, and the treatment, both general and local, was discontinued. On the 30th of October, Mme. X. being *enceinte*, was brought to bed at full term. The child, a boy, had no traces whatever of syphilis, nor any general alteration.

I thought it prudent to advise the mother of the possible, though little probable, existence of syphilis in her child, and the consequences which might supervene were the child given to a nurse. It was decided that it should be brought up on the bottle, which was done for several days. But, upon the pressing request of the family, who were entirely ignorant of the reason for my action, a nurse was engaged, and up to the seventh week nothing supervened. Still, being uneasy, I begged the mother to watch her child carefully and to examine the mouth every day, and to advise me if she saw anything at all out of the way. Mme. X. recovered from her childbed very well, and when she got up the chancres were entirely cicatrized, and a month later she left for Italy to join her husband. The child was under the care of its grandmother during her absence. At the end of seven weeks I was called to the child, and found a general papulo-vesicular eruption, especially upon the thighs, mucous patches on the scrotum and under the tongue, on each side of the frenum, and a well-marked coryza. I instantly put a stop to its nursing, and ordered the liqueur de Van Swieten. At the end of fifteen days the mucous patches and the eruption had disappeared, except the coryza, which still continued.

At the same time and about the same date as her infant's trouble, Mme. X., during her journey, discovered mucous patches upon her vulva and about her anus, which were cicatrized by her husband himself with a pencil of the nitrate of silver. All the symptoms disappeared so far as the mother was concerned, but in the child laryngeal ulcerations supervened, and it died after a rapid marasmus, caused either by the disease or by its method of nourishment.

Here we have a case in which the disease was probably transmitted at the end of the seventh month of pregnancy, the initial lesions making their appearance early in the ninth month. The period of incubation was thirty-eight days, if we suppose that the chancres did not appear before the date assigned—i. e., October 5th. It is probable, however, that they began earlier, say on the 25th or 26th of September, which would bring them in the eighth month of pregnancy.

Vajda (Wiener medizinische Wochenschrift, 1880) gives another interesting case bearing upon this subject. It runs as follows:

A little journey made upon the 20th to the 24th of June, 1873, afforded a young married man the opportunity to try his luck outside of his marital relations, returning two or three days afterward to his home. His wife was then in the fourth to fifth month of her pregnancy, and had always enjoyed good health. On August 10th V. examined her, and found her free from chancre or indolent buboes. The husband had a chancre. On September 9th he indulged in coitus with his wife, he then having an unhealed chancre.

She then was in the seventh month of her pregnancy. On October 17th she developed a hard chancre and an inguinal adenitis. Seven to eight weeks after the infecting coitus the man showed several general symptoms of syphilis. Afterward he had papules and a buccal psoriasis. The wife had buccal mucous patches, which repeatedly relapsed. At full term she was delivered of a child, which seven weeks after birth showed papules, and subsequently developed ozena, psoriasis, and pustules. Upon the development of syphilis in the child, the possibility of extra-uterine infection was thought of, but on a review of the history such a theory was rejected.

In this, as in the preceding case, the infecting coitus took place in the seventh month of pregnancy—i. e., on September 9th. Thirty-eight days afterward, on October 17th, in the eighth month of her pregnancy, an initial lesion, accompanied by inguinal adenitis, appeared, and the child, which was carried to full term, although born healthy, showed signs of disease after birth.

Neumann (Wiener Medizinische Presse) gives the statistics of one hundred and twenty cases of syphilitic women, among whom twenty were infected *post-conceptionem*. Of these twenty women, five had syphilitic and fifteen had nonsyphilitic children. The mothers of these five children were infected as follows: One in the third month, two in the fourth month, one in the seventh, and one in the eighth. Of the fifteen children who were born free from manifestations of syphilis, seven died at periods ranging from twenty days to six weeks, but without showing any positive signs of syphilis; four lived, and in four others no data were given.

Taking the mothers of the eleven children about whom information is furnished, one was infected in the first month, one in the third month, three in the fourth month, one in the fifth month, two in the sixth month, one in the seventh month, and two in the eighth month.

One striking point in these statistics is the fact that, of the fifteen children here recorded as being free from syphilis, seven died very shortly after birth, the latest at six weeks, and in four no data were furnished, so that really only four children in fifteen are known to have lived. It is possible that these children had died before the symptoms had time to develop.

The next point which would come up for consideration is, whether

A child born of a syphilitic woman can after birth be infected by its mother and exhibit the signs of an acquired syphilis—i. e., *an initial lesion, followed by syphilides of the skin or mucous membranes.*

That such can occur has been claimed by Arning, who reports the case (Vierteljahresschrift für Dermatologie, etc., 1883).

A woman was infected with syphilis by her husband in the fourth month of her pregnancy. She was treated for light secondary symptoms during the time of carrying the child, and at full term was delivered of a stout, healthy, well-developed child. Two children had been born of this woman previous to her contracting the disease: the first one was living and healthy; the second died during birth, from strangulation by the cord.

The child was born on the 25th of October, 1881. The woman suckled her child with both breasts at first, but afterward entirely on the right breast, as the left was affected with fissures.

Four weeks later the woman noticed at the left angle of the child's mouth a moist patch, which, at first stationary, extended to the upper lip and then began suddenly to destroy the lip. In due course of time an eruption appeared over the body, and the child was brought to the Polyclinic.

It was a well-nourished, healthy-looking child, except for its face, which had been changed in a most remarkable way. Almost the entire upper lip had disappeared, only a small piece remaining at the corner of the right side. That portion which was left was thickened and infiltrated, the surface of the sore was almost dry and free from pus, such as is found in the initial lesion.

The submaxillary glands were very markedly swollen, and the glands of the rest of the body were also swollen, but in a much less degree. On the body was an extensive medium-sized papular syphilide, especially pronounced on the head and scalp.

Nothing on the hands and feet, but about the anus and vulva were moist papules. A month later, periostitis of the index-finger of the left hand developed, and five weeks later the child died. On autopsy, nothing characteristic of hereditary syphilis was discovered.

On reading this report over carefully, Arning's view in considering this case one of acquired syphilis may very fairly be questioned. The moist patch was not an initial lesion, but a mucous patch; and the fact that the glands under the jaw were more swollen than elsewhere, would not be of any more significance than indicating that they had been irritated into an active condition by an inflammatory process going on in the ulcerating mucous patches of the lip. Apparently the eruption came on at the same time the ulceration began, although no very positive statement is made as to the time of its appearance—an occurrence which would not be the case were the lesion from an acquired source, as the law of incubation holds as good with children as it does with adults.

Among the many interesting points which come up for consideration and study in this class of disease is the question, *Can hereditary syphilis be transmitted to the second generation?*

M. Davasse, in his work La Syphilis, sa forme, son unité, reports a case as one of hereditary syphilis attacking the descendants of the second generation, simulating affections of a rachitic and scrofulous nature, caries of the bones of the nose, etc., which, although extremely interesting, is defective in the one important link necessary to prove the point at issue. The patient, a young woman sixteen years of age, is attacked with the symptoms noted above, and which yield in a certain degree to a course of mercury. The grandmother presents a condition of the palate which may very easily have been due to an old syphilis; but the important link in the case—the father's and mother's condition—is wanting. They are said in one portion of the history to have been of excellent constitution, and to have presented the appearance of the most exuberant and perfect health. But there has been no opportunity to examine either of them as regards any syphilitic antecedents, and so long as the history is deficient on these very important points the case can not be accepted as proving the point raised by the question which heads this section.

Mr. Hutchinson (*Clinical Lectures and Reports of the London Hospital, 1865*) gives the history of three cases, which he apparently believes to be instances of hereditary syphilitic transmission to the second generation. They are defective in many important details, and in some of them I think it may be fairly questioned if the point of transmission is proved.

> The first case is one in which the mother had a very syphilitic physiognomy; her corneæ were clouded by bygone keratitis. The bridge of her nose was sunken, and her complexion was pale and unhealthy. I asked her to show her teeth, and they proved to be most typically malformed. She was a tall woman, of dark complexion. She told me she had but the one child above mentioned, and that she never had any others, nor had she any miscarriages. She reported that her child, except as to her knee, had never been ill. The child, a girl three years old, was of dark complexion and of well-formed features. She was florid and rather handsome. Her ailment was chronic synovitis of the left knee-joint, the knee being rather swollen, but not especially painful. She had no other disease. Her eyes were perfect, as also her hearing.

In this case there is no evidence to show that the child ever had syphilis. Certainly the synovitis could not properly be called so, and hence this case can hardly be accepted as proving anything in either direction. The mother very probably did have at some time of her life inherited disease of a syphilitic character.

The second case is of no scientific value, because the children of the man who is reputed to have been the subject of inherited syphilis were not seen, and the history which the father gives of them did not show that they had ever suffered from syphilis.

The third case is as follows:

> Mrs. W. came under my treatment for syphilitic keratitis. She was a florid young woman, aged twenty-one, who had been married one year, and was now nursing her first child. Although her aspect was florid and she looked fairly healthy, yet she presented, in addition to the keratitis, unmistakable evidences of inherited taint. Her teeth were notched, there were scars at the angle of the mouth, and her forehead was protuberant.

I inquired as to the health of her child, and was assured it was perfect. At my request, she brought it at her next visit, and I found it plump and well-grown, but its nostrils were obstructed, and its buttocks were covered with copper-tinted and scaly patches of an unmistakable character. These symptoms disappeared subsequently under mercurial treatment, and the child is now living and well.

Mr. Hutchinson then goes on to say: "Here, then, we appear to have an instance of a mother who is the subject of inherited syphilis transmitting a taint to her offspring, and that offspring showing the usual conditions of infantile disease. No such a fact has, I believe, been as yet recorded in the annals of medicine, and it ought to be received with incredulity. Might not the taint from which the child suffered be the consequence of acquired disease in one of the parents?"

As regards the mother, I believe such a suggestion highly improbable. She appeared to be a modest, well-conducted persón. She was quite young, and respectably married; she had, besides, no symptoms of acquired disease, and, as being the subject of inherited taint, she must be supposed in some degree to be protected from contagion even had she been exposed.

As regards her husband, I made the most careful investigation. He was a commercial traveler, and was under my care on account of a sycosis. He had previously been under the treatment of Mr. Erasmus Wilson and Mr. Startin, neither of whom had suggested that his eruption was syphilitic. Except the eruption, which was sycosis of the most characteristic form, he was fairly free from symptoms. He gave me an apparently candid account of his sexual conduct prior to marriage, and assured me most positively that he never had any form of venereal disease. He was most anxious to be cured of his sycosis, and would, I think, have confessed anything which he thought likely to assist in his treatment.

He was a florid, healthy looking man. I treated his sycosis with syphilitic remedies for some time, but they did no good whatever.

Another case of the kind has been reported by Dr. J. E. Atkinson, of Baltimore (Archives of Dermatology, January, 1877):

Julia H., born in America of Irish parents, aged nineteen, married, came to the special dispensary, February 1, 1876, to be treated for an eruption upon both arms and forearms, which had appeared four months previously, when she was more than three months advanced in her second pregnancy. She is well developed, of fair complexion, blue eyes, and light hair; her skin is moderately soft and smooth, her forehead is somewhat square and prominent, and there is a slight flatness across the bridge of her nose, hardly enough, however, to attract attention, were it not for the concomitant circumstances and conditions. The large upper central incisor teeth are shallow, but very positively notched in the style peculiar to subjects of inherited syphilis; they are somewhat undersized, and not in contact with each other. Her eyes present a hazy, boggy condition of the cornea, the remains of a syphilitic keratitis, which, according to the statement of her mother, must have occurred about seven years ago. Her eyes were affected quite a long time, and she was almost blind.

She was treated by an oculist, who cut the corneæ of her eyes. There were no linear cicatrices such as are so frequently seen about the mouths of persons congenitally syphilitic, nor are there any scars suggestive of ulcerative lesions about her person. She has been married three years, and has a child eighteen months old. About one year ago she brought this child to the dispensary with an eczematous eruption about the arms, which disappeared under the application of the benzoated oxide of zinc ointment. It had never undergone any specific treatment, and is at present a healthy, vigorous child.

Some time after the birth of this child the mother was under treatment at the dispensary for a crescent-shaped papulo-squamous eruption upon the thigh, which was considered by my colleague, Dr. N. G. Keirle, who attended her, to be syphilitic. Dr. Keirle at the same time recognized her inherited taint, to which he attributed her eruption. No trace of this eruption remains.

February 1st, the present eruption consists of four or five patches on each arm. They are circinate, their centers being of perfectly healthy appearance. They are composed of quite large papules, with slightly scaly summits. They vary from one half to one and a half millimetre in diameter, the papules being rather smaller than peas. These patches are arranged, for the most part, on the extensor surfaces of the forearms, a few being on the arms. They occasion no itching or unpleasant subjective symptoms, and are colored in the usual manner of syphilitic eruptions. The patient denies having had any sores upon or about her genitals, and her inguinal glands are of a perfectly normal appearance. Her husband, whom I have examined, denies ever having syphilis or any venereal complaint. He presents no symptom of syphilis at the present time.

The evidences of hereditary syphilis in this patient receive ample support from the history of her family. Her father denies ever having syphilis. He has some opacity of the cornea, which he attributes to an attack of violent inflammation several years ago, following a prolonged debauch.

The mother of our patient has numerous cicatrices upon her face, particularly about her forehead, which are very suggestive of old syphilitic disease. Of her offspring four died in infancy, the first in spasms, one year old; the second in spasms, two weeks old; the third and fourth, each at the age of fifteen months; the fifth child is our present patient; the sixth child, a girl, Honora, now eighteen years old, is tall and stout, much resembling her sister in appearance.

She has a decided syphilitic notch of her right upper incisor, and her corneæ are more hazy than those of her sister, for, while the cloudiness in the corneæ of the latter diminishes toward the center, in this girl's eyes it seems to be evenly distributed over the whole surface. Four years ago Honora became suddenly deaf, and was brought to the dispensary for treatment. She slowly recovered under specific treatment, and at the end of six months she was quite well again. Two and a half years ago she again became suddenly deaf and remained so ever since, hearing only very loud noises. She was treated by my friend Dr. Samuel Theobold, who has kindly furnished me the following extracts from his notes: "Almost total loss of hearing of six weeks' duration from otitis media (acute), due to inherited syphilis. Present condition: Left ear, membrane perforated and otorrhœa present; right ear, membrana tympani thickened, vascular, and much depressed. She has nebulous corneæ and history of severe inflammation of the eye. (Her father's eyes are in the same condition.) Eustachian tubes pervious to Politzer's bag, but no improvement to hearing from it."

Dr. Theobold thus thinks that the lesions in the father's eyes are the result of interstitial keratitis likewise.

April 1st, three weeks ago, Julia, the subject of this report, was delivered at term of a small child, which is now of fair size and healthy looking. She has had much headache since her confinement.

The eruption on her arms has faded, the coppery staining having entirely disappeared. The patches, however, still remain, consisting of slightly prominent large papules, not at all scaly, and hardly different from the surrounding surface in color; to the touch they are soft, and as if all inflammatory infiltration had disappeared. She has as yet taken nothing but a tonic mixture and thrice daily four minims of Fowler's solution of arsenic, antisyphilitic treatment being purposely withheld.

June 27th, the eruption on the mother's arms presents the following appearance, viz.: The oldest patches now have nothing remaining except their markings arranged in a circinate form, unelevated and undepressed, whiter than the healthy skin, but not different from it in resistance. New patches, however, have appeared; the older of these, having lost the copper color originally possessed by them, present large papules without discoloration and without any difference from the normal integument. Those patches of more recent date precisely resemble those first described in their syphilitic coloration, configuration, etc. The woman's general health is now good, and the only evidence of the increased intensity of the morbid process is the augmented number of patches which have now invaded the thighs and legs. She bears upon her person no other evidence of syphilis. For the first time she began to take the iodide of potassium in five-grain doses, three times daily, mercury being purposely withheld. By July 28th the papules had all disappeared, leaving in their places the numerous circles of white spots already described. Not a single patch appeared after the iodide of potassium was ordered.

Toward the end of April, when the baby was about six weeks old, its mother first noticed that it had a very feeble voice in crying, and that it was without vigor. It was brought to me on May 18th, suffering from coryza, which it was said to have had for some time.

Scattered over its head, trunk, and extremities were many small spots of roseola, which its mother described as having been more red than at present. They are now of the peculiar copper color of syphilitic eruptions. There existed at the same time numerous minute excoriations about the anus and buttocks, resembling, however, not so much mucous patches as the ordinary conditions of an aggravated erythema produced by long contact with urine and fæces. The child appeared to be tolerably well, and, as there were no immediately alarming symptoms, syphilitic treatment was avoided, benzoated oxide of zinc ointment being applied to the buttocks.

June 27th, the child has fallen off much in flesh, and has acquired a withered and senile look. He cries feebly, almost continually. About three weeks ago he began to roll his head about on the pillow, and at the same time fresh spots came upon the skin. The erythematous and excoriated condition of his buttocks persisted, while on the scrotum it amounts to an eczema, red, raw, and exuding. There is diarrhœa.

The roseolous patches are scattered all over the integument. They are generally small, but sometimes coalesce into large patches. They are dry, and almost without discoloration.

About the buttocks, along the limits of the old erythematous surface, they are wrinkled. Their general color is a characteristic ham or copper color, different from the nonspecific erythematous eruptions of infants. The palms of the hands and the soles of the feet are reddened, dry, and wrinkled, not scaly. There is some coryza, but the child does not snuffle, nor are there any fissures or cracks about the nostrils. The corners of the mouth, however, are slightly fissured. The peculiar muddy or yellow-clay color of the face, and especially of the eyebrows, is very characteristic. The benzoated oxide of zinc ointment is applied to the buttocks and the scrotum, and a flannel band smeared with equal parts of the above ointment and mercurial ointment is to be wrapped around the body, newly applied overnight.

By July 8th the eruption is noted as fading, the epidermis of palms and soles is peeling, and the body is described as much better.

July 28th, the bandage has not been applied for ten days, owing to the intensely hot weather. The roseola is gone, leaving a faint staining, and the child is very much better.

August 28th, the child has had an obstinate diarrhœa, which has reduced it very much. There are no other symptoms than an almost entire voicelessness, the mouth, in crying, being widely opened, while there is scarcely any audible sound given forth. The infant was not again brought to me, nor was it again under medical treatment.

It died October 7th. It had taken no medicine for weeks, I was informed by its mother, and it had a persistent diarrhœa, and toward the last "inward spasms" and rolling of the head.

The next case is one reported by Cæsar Boeck, of Christiania (Annales de Dermatologie et Syphiligraphie, October, 1889):

The grandmother was treated at the age of eighteen years—from April to July, 1854—for ulcerations of the genital organs, a macular syphilide, and mucous patches of the right tonsil. She entered hospital again in July of the same year with an ulceration of the posterior commissure and the labia majora, was treated with calomel, and went out in September, 1854.

In March, 1860, she brought her child (a girl) to the hospital, the said child being then two months old. It was treated in the hospital by Prof. W. Boeck for severe congenital syphilis until July, 1860.

Three years later (1863) it returned to the hospital with an affection of the eyes, which was first believed to be a scrofulous ophthalmia, but which was undoubtedly of syphilitic origin. Re-entering the hospital in May, 1889, the child, now a woman grown, bore the indelible marks of congenital syphilis in the shape of rugous cicatrices about the mouth, the traces of an interstitial keratitis of both eyes, and almost complete atresia of the iris of the left eye, the sight of which was entirely lost. In addition, the median upper incisors showed the crescentic notch of Hutchinson.

This woman, twenty-nine years of age, brought, in May of the present year (1889), her son, who is suffering with a clearly marked congenital syphilis. This child was born on the 7th of December, 1888, and is nearly five months old. The disease showed itself when the child was two and a half months old, and began with a coryza, accompanied by a maculo-papular syphilide situated in the inguinal folds, upon the thighs, and lately upon the face, especially about the mouth, the chin, and the forehead. At its entrance, the child, besides this macular syphilide, showed red and glistening patches upon the palms of the hands and soles of the feet, and of the palmar and plantar surfaces of the fingers and toes; upon the lips and corners of the mouth were deep and bleeding fissures; and, during its stay in the hospital, periostites developed upon the internal surface of the two tibiæ, which disappeared, together with the other symptoms, under the use of the iodide of potassium.

Boeck thinks that here he has without question a case of congenital syphilis in the child, and, in order to be certain, he subjected the parents to a careful questioning, and they both assured him that none other but themselves had cared for the child.

In order to prove positively that this was a case of congenital syphilis transmitted to the second generation, it was necessary that the heredity on the father's side and reinfection on the mother's side should be absolutely excluded. For this purpose he subjected the father, who is forty-five years of age, to a very careful examination. He denied absolutely having had syphilis at any time; he said that he had been married for the first time at the age of thirty-two; that his first wife, by whom he had no children, died in 1883; and that he married his present wife in 1884. A careful examination failed to reveal any trace whatever of a preceding syphilis. He was in every sense of the word an apparently sound man, and appeared younger than he really was. The mother's history was that before her marriage she had a child by another father in September, 1883. This child was born in the Maternity Hospital at Christiania, and neither upon herself nor upon her child were any traces discernible of a recent syphilis. When the child was fifteen days old it was separated from its mother and given in the care of strangers, but it died when a month old in consequence of convulsions. According to the mother's statement, it never had any eruptions before its death.

In 1884, as has already been stated, she married, and in May, 1886, she gave birth to her first child from this marriage. This child in every way was in flourishing health up to the age of two years and two months, when it was affected with a scarlatina, and died with the symptoms of croup. The second child is the one under consideration, and which is affected with hereditary syphilis. Thus, after a careful examination of the mother, it has been impossible to discover any traces of a recent syphilis. This circumstance, as well as the fact (?) that the first two children have shown no signs of syphilis, and, above all, that the second child was in a state of perfect health up to the age of two and a half years before succumbing to its attack of scarlatina, induces Boeck to believe that the mother had not been affected in any way with recent syphilis; "for," he states, "it is well known that the more inveterate syphilis is in the mother the greater the possibility for a diseased child to be born after a healthy one; and, if the mother had acquired syphilis after the birth of her second child in 1886, she would in all human probability have infected her husband, who was not diseased."

A perusal of these cases would lead to the belief that syphilis may be conveyed to the second generation; but, notwithstanding the care with which they have been reported, the fact may yet be questioned, particularly when we recollect how difficult it is to positively exclude the existence of an attack of acquired syphilis in the heredo-syphilitic person, either from his or her statement, or by a personal examination. This very naturally suggests the question :

Can the subject of hereditary syphilis acquire syphilis later in life?

Mr. Jonathan Hutchinson, in The Clinical Lectures and Reports of the London Hospital for 1865, gives the history of some cases, only one of which, however, is of any peculiar value in proving (?) this point.

E. H. M., aged twenty-one, was admitted under my care at the Mooresfield Ophthalmic Hospital, July 6, 1863. His right cornea was inflamed, and he stated that it had followed an injury from lime a fortnight before. The cornea was diffusely opaque, and the eye was very irritable. I prescribed at first tonics internally and opiate fomentations, being misled by his statement that he had lime in it. On the 20th I recognized iritis of a slight degree and the dotted condition of the cornea, taken with the slight inflammation of the iris, presented a condition similar to what used to be called "irido-capsulitis." Iodide of potassium was now prescribed. In the middle of August the left cornea began to inflame. At this time the right cornea was so opaque that it was impossible to inspect the iris, and it presented the exact condition of syphilitic keratitis. His physiognomy did not suggest hereditary syphilis. It is true that his skin was pale and of a bad color, but his nose was narrow, with a very high bridge, and his teeth were perfect in form, size, and color. In making inquiries into his history, he mentioned that his mother had suffered in her eyes, and, thinking that some light might perhaps be obtained in respect to his own diathesis, I requested that she should attend.

His Mother's History.—On August 29th Mrs. M. attended with her son, and brought with her one of Mr. Thomas's out-patients' letters. From notes on the letter, I found iridectomy for synechia and relapsing iritis had been performed six years ago. She had obtained great benefit from thè operation. There were still bands of synechia in the lower part of the pupil. The original attack of iritis had occurred twenty-five years ago. On being taken aside, Mrs. M. told me without reserve the whole history of her troubles. Her husband had been a most dissolute man, had frequently suffered from venereal disease himself, and had communicated sores to his wife several times. Her worst attack was when the iritis occurred, at which time she had a very free rash. Several of her children had died of the disease. Our patient was one of her younger children, and was born six or seven years subsequent to his parent's contamination. The three infants preceding him had all died. In infancy he suffered from a rash, and was treated by Dr. Reese, who referred it to the venereal taint. After infancy he had fair health until about the age of fifteen, when his left eye inflamed.

Acquired Disease.—He was under my care for gonorrhœa four years ago, and since that has been much exposed. A year ago he appears to have had true syphilis. He does not recollect a chancre, but he had a copious, scaly rash, and a bad sore throat. This lasted for three months or more. The surgeon whom he attended told him it was syphilis, and gave him mercury to salivation. Although he did not recognize the chancre, I think there can be little doubt that he had one. His description of the rash is very minute, and numerous spots occurred on the penis and scrotum; so it is very possible he may have mistaken the original sores. Since it was well he has had a sore, and also a gonorrhœa.

February 20, 1865. He has remained steadily under treatment with iodides, etc. The corneæ have gradually cleared: with the left eye he reads minion size; with right, only words of great primer size.

In both eyes clouds still remain in the corneæ, and, in both, the ciliary regions look thin and bluish. He has still a little psoriasis about the lips and chin, and a few patches on the body. In other respects he is in good health. There are no iritic adhesions.

This is certainly a pretty distinct history, and gives in detail a presumable history of syphilis in the mother, together with one in the child. Moreover, the boy himself, when he reaches years of discretion, contracts syphilis on his own account, and presents unmistakable symptoms of the disease. There is little to criticise in the case on the ground of lack of detail, as, in the minor points which are wanting, there can be no human possibility of obtaining absolute knowledge unless the reporter had seen the boy during his infancy and followed the case up from that time on. Indeed, the minutiæ of the case are unusually well worked up.

If in these cases we follow analogy, comparing the course pursued in acquired syphilis in cases of reinfection, there is nothing which is not perfectly possible, and which can not be accepted as likely of occurrence in the case just given. In acquired syphilis it is not believed that the second infection occurs while the first diathesis is still present; but when that has disappeared a second infection is possible, and many well-attested cases exist in medical literature as showing that such a possibility does occur. Why not the same thing in hereditary syphilis?

While the diathesis existed there is no reason for supposing that infection can exist; but when for any cause this diathesis ceases to be operative, then a person becomes again liable, and, upon exposure, may contract the disease again.

There is nothing in the case of Mr. Hutchinson to militate against this view. The subject of the treatment receives an injury to the eye which excites a keratitis, at first diffuse, but which subsequently shows the punctate form such as is found in hereditary disease, but which did not come on at this time. The probabilities are that it happened during the young man's infancy, and that it was masked by the acute inflammation which followed the injury.

In addition, iritis declared itself, but nothing else which could be referable to the inherited taint. The mother's history is clear, and points without reasonable doubt to syphilis in her, thus strengthening the suspicions produced by the son's eyes. He then contracted syphilis, and although he did not recognize the initial lesion, and was thus led to deny its presence, it probably existed. But it may be urged that his statement about the nonexistence of the chancre was true: that this was not a case of acquired but of hereditary syphilis.

What can be opposed to this view of the case? The symptoms which appeared were a scaly rash and a sore throat. Now, had this outbreak been one of hereditary syphilis, the symptoms coming on at the age of twenty-one would have been of the advanced—the ulcerative—type, and not of the character here described. To my mind, there is not the least reason for questioning the correctness of the view that this belonged to an acquired syphilis, and I further think that this man had previously suffered from hereditary disease as well.

BACTERIOLOGY OF HEREDITARY SYPHILIS.

In 1886, Kassowitz and Hochsinger, of Vienna (Wiener Med. Blätter, 1886), called attention to the result of autopsy in five cases of hereditary syphilis, in which they found streptococci in the bullæ of pemphigus, in bones, liver, pancreas, and thymus glands. These bacteria were found in the smaller blood-vessels and in the interspaces of tissue, but never in blood-corpuscles nor the interior of cells and fibrous tissue. While not prepared to say that these streptococci were the direct cause of hereditary syphilis, Kassowitz and Hochsinger believed that they played an important *rôle* in the course of the disease.

Chotzen, of Breslau (Vierteljahresschrift für Dermatologie, etc., 1887), examined the bones in three cases, the skin in nine cases, the liver in six, the glands in two, the intestinal mucous membrane in one case, and the umbilical cord in one case, and found streptococci in the following instances: in the bones once in three times, in the skin five in nine times, in the liver four in six times, and in the intestinal mucous membrane in the single case where he examined this tissue, confirming Kassowitz's and Hochsinger's researches. The result in the umbilical cord is not given.

Chotzen found that in the skin the streptococci were seated principally in the small vessels of the subcutaneous cellular tissue, in the neighborhood of the large vessels and of the sweat and sebaceous glands, but never in the fat-cells nor in the glandular tissue. The same was true of the liver and bones.

They were especially abundant in the intestines, in all the coats (serous, muscular, and submucous), and in the mucous layer, especially about the tips of the intestinal villi, particularly those which had been deprived of their epithelium. They were never found in the blood-vessels, but about their periphery, and were abundant in the lymphatic spaces.

Chotzen admits that streptococci are not always present in cases of hereditary syphilis, and are sometimes found where there is no evidence of the disease; nevertheless, he believes that, while there is no proof that they are the cause of the syphilis, they play a by no means unimportant *rôle* in the final result, producing a fatal result when they are abundant.

MORTALITY OF SYPHILITIC INFANTS.

Published statistics show a large mortality, and it will be interesting to note, first, the proportion of dead to living children; and, second, the symptoms which these dead children present.

The first set of figures is taken from the records of births of syphilitic children at the Moscow Hospital, from 1850 to 1870 inclusive, with deaths from this cause:

YEARS.	No. of children.	Deaths.	Percentage.	YEARS.	No. of children.	Deaths.	Percentage.
1860…………	224	148	66	1866…………	165	124	70
1861…………	204	150	75	1867…………	174	131	69
1862…………	140	93	67	1868…………	208	152	73
1863…………	150	123	82	1869…………	184	116	63
1864…………	198	139	70	1870…………	184	118	65
1865…………	171	131	70				

From these statistics it will be seen that the highest percentage reached was eighty-two, the lowest sixty-three.

The next list is one furnished from the statistics of sixty-one cases occurring in Sigmund's wards, and are collected by Dr. Pick. It gives the duration of the mother's disease, the form of her syphilis, whether she had been treated with or without mercury, and the condition and results of the births. Although in some of the cases it is an open question whether the children really succumbed to syphilis, it is hard to avoid the conclusion that they did, after all, die as a result of their inherited taint, even though indirectly. Thus the cases of pneumonia, diarrhœa, and tabes are probably due to the syphilis, although all three diseases may occur independently of syphilis.

Out of these sixty-one births, fifty-nine died, seventeen were premature births, and forty-four were at full term. Of the seventeen premature births, eleven were born dead; of the forty-four at full term, three. Of the forty-seven living children, four lived more than three months; and in two the result was unknown. Of the remaining forty-one, the mean duration of life was twenty-six days—the shortest period being one hour, the longest ninety days.

DATE OF APPEARANCE OF SYMPTOMS IN INHERITED SYPHILIS.

An important question comes up as to whether the indications of inherited disease appear immediately at or after birth, and, if the latter, how soon after? At one time the belief was current that syphilis was manifest at birth, or a few days subsequently. But further investigation showed that, while this is true in a large proportion of cases, many instances occur in which the manifestations of syphilis are delayed for several months. Roger (Union Médicale, 1865) collated two hundred and forty-nine cases from several sources; Diday, one hundred and fifty-eight; De Méric, twenty-eight; Mayer, forty-nine; Roger, fourteen. In two hundred and seventeen of these syphilis appeared before the end of the third month, and in thirty-two it came later. Sifting these cases still closer, it will be seen that, although a very large percentage occurred early in extra-uterine life, there were several cases in which the manifestations of the inherited disease were delayed long beyond the usual three months. Thus, in Diday's cases (Syphilis des Nouveau-Nés), syphilis appeared before the first month in eighty-six cases; before the second month in forty-five; before the third month in fifteen; at the fourth month in seven; at the fifth month in one; at the sixth month in one; at the eighth month in one; at the twelfth month in one; and at the twenty-fourth month in one. Of these one hundred and fifty-eight cases, syphilis appeared in one hundred and forty-six before the end of the third month, leaving twelve cases in which the outbreak of the disease was delayed till later. Taking these one hundred and forty-six cases in which syphilis appeared before the expiration of the third month, it was found that eighty-six of them took place before the end of the first month, and one hundred and thirty-one before the end of the second month.

Twelve cases are left in which no signs of syphilis appeared up to the end of the third month, and, of these, ten presented evidence of disease before the expiration of the first twelve months of extra-uterine life; two only are left in which the disease is still further delayed.

The same author gives another series of one hundred and five cases, in forty-five of which symptoms appeared before the end of thirty days after birth; and, of these forty-five cases, twenty-four were attacked before the end of fifteen days; and, of these twenty-four, ten before the end of the eighth day.

De Méric (Lancet, London, 1858) gives the result of twenty-eight cases in which the date can be assigned for the appearance of syphilitic manifestations. Of these twenty-eight cases, syphilis appeared in two cases a few hours after birth; four cases, one to ten days after birth; five cases, ten days to three weeks after birth; ten cases, six to thirteen weeks after birth; one case, twelve months after birth; one case, thirteen months after birth; one case, fourteen months after birth; one case, fifteen months after birth; one case, twenty-one months after birth; one case, twenty-seven months after birth; and one case, eight years after birth.

It will be seen that twenty-one out of twenty-eight cases occurred within the first three months, and only seven after that period, agreeing pretty closely with the result of Diday's experience.

Luzinski (Wiener medizinische Zeitung, 1884) gives as the result of his experience the following statement: "It is seldom that syphilitic manifestations show themselves earlier than the sixth week or later than the third month. In fifty-three per cent of the cases they occurred between the sixth and eighth week after birth, and in only sixteen per cent do they occur after the third month."

It is very evident that the majority of cases present manifestations within the first three months, but a small number of cases are said to occur several years after birth without having shown any symptoms prior to that time. This is contrary to the generally received opinion, which assigns one year as the outside limit in which symptoms can possibly occur; and if none appear within that period, that the child may be considered as exempt from any chance of showing subsequent manifestations. Indeed, Diday assigns a much shorter period, for he says that when the third month is once passed there is not much probability that any symptoms will manifest themselves.

Is it possible, then, that syphilis can be latent for several years without showing symptoms during the earlier period of the child's life?

I do not believe that it can. The time at which this late outbreak generally occurs is about the age of puberty, a period at which inherited syphilis is prone to show itself. It must be borne in mind that there are three periods in the life of a subject of inherited syphilis in which the disease is likely to crop out, viz., at birth, at puberty, and at the close of middle life. If a child is born apparently perfectly healthy—and many a syphilitic child is so born—early manifestations are apt to be slight and escape attention, or to be assigned to other causes. These symptoms will in time then disappear of themselves, leaving no trace behind; and when the child later on, at the age of ten, twelve, or fourteen years, presents symptoms which are unquestionably syphilitic, it is believed that they are the first manifestations, and the case is heralded as one of those instances of infantile syphilis which has been delayed for several years. These are the cases which the older writers described under the name of "struma."

Sometimes the surgeon is fortunate enough to discover cases of interstitial keratitis, of scars about the angles of the mouth, of Hutchinson's teeth, of an old iritis, or an arrest of development, which at once serves to notify him that earlier trouble has existed, notwithstanding the history of previous immunity. Sometimes, however, he discovers nothing, and he is thrown back on his own resources to determine the truth of the patient's statement.

One circumstance will serve him as a guide, viz., the character of the lesions under observation. They are always, so far as my experience goes, those pertaining to the late forms of syphilis, those classed under the time-honored name of tertiary syphilis. Throwing aside, for the present, the cases of children who are so profoundly poisoned by syphilis that they sometimes show at birth an advanced stage of the disease, inherited syphilis displays much the same course which the acquired variety does. It follows a pretty regular gradation from the lighter to the more severe stages. If, then, patients of thirteen or fourteen years of age present themselves to the surgeon with periostitis, ulcerations of the palate, or serpiginous ulcerating lesions of the skin, which he is satisfied comes from inherited syphilis, he can infer previous milder manifestations of the disease, as certainly as the paleontologist will deduce the existence of extinct fauna from the imprints which they leave behind them on the rocks and sandstone, though he has never seen the animals himself. *Ex pede Herculem.* Syphilis often leaves its story so plainly written that he who runs may read; and although the earlier symptoms have come and gone and left no trace behind when the late syphilides appear one may be sure that previous symptoms have existed. It is not that I doubt the existence of syphilis hereditaria tarda, but what I do not believe is that inherited syphilis remains latent for several years before declaring itself, and no cases that I have yet seen or read about have convinced me to the contrary. Durac, in his Thèse de l'Hérédité de la Syphilis, quotes Ricord as saying that he has seen the symptoms of inherited syphilis make their first appearance after-an incubation of ten, twenty, or more years. This was stated at the Séance de l'Académie de Médecine, October 8, 1853: "Qu'il a vu des sujets chez qui la verole héréditaire ne s'est manifesté qu'a l'âge, de quarante ans."

This statement I have not been able to verify; but, if true, it is an extraordinary fact.

Quesada (La Syphilis Congénitale) records three cases of inherited syphilis in which the symptoms first manifested themselves at the ages of six months, two years, and three years, respectively; but it is very doubtful indeed whether any of them were cases of inherited syphilis.

Robert (Maladies Vénériennes) gives the history of two cases, in one of which the patient was sixty-five and in the other forty-two years of age, and in whom no other symptoms had made their appearance. The cases are extremely doubtful, are not convincing, and do not, in my opinion, prove anything.

Gréssant (La Syphilis Héréditaire Tardive) gives a case of Dumesnil, in which the patient was aged seventeen when he came under observation with the symptoms of syphilis; but in this boy there was evidence to show that he had had manifestations of his disease in early life.

Augagneur (Étude sur la Syphilis Héréditaire Tardive) gives the history of two cases, one of which is personal, the other is communicated by M. Horand. In the first, the symptoms—periostitis of the tibia and cephalalgia—commenced when the patient was twenty-six years of age, and were finally cured by iodide of potassium. His mother had been syphilitic, and he was born five years after his mother's infection, although it is stated that he had not had any symptoms of inherited disease, nor had he acquired syphilis. It is very unlikely that, with these antecedents, he should have gone through twenty-six years of his life without showing some of the earlier symptoms, which would, I think, leave no traces of their presence.

In the second case there was found a retino-keratitis, with a central corneal opacity, which was probably the result of ocular trouble in his infancy; and, if so, to what so likely due as to syphilis?

Fournier, in the Gazette Hebdomadaire, Paris, gives the history of a man in whom the symptoms appeared in his thirty-first year, but previous manifestations had occurred in early life. The case is as follows:

> M. X., aged thirty, presented himself to M. Fournier with lesions which were evidently gummous ulcerations of the penis. He denied absolutely and in the most emphatic manner that he had ever acquired syphilis. On examining the patient further, Fournier found that he had a bilateral kyphosis, which had existed since infancy; evidence of an old keratitis, and lesions of a serious affection of the kneejoint.
>
> Dr. Hermet examined the patient's ears, and reported that on the right side a watch was heard only at ten centimetres distance. The tympanum was misshapen, thickened, and presented disseminated fibrous bands across it. There was then no perforation, but he said it probably existed formerly.
>
> The ossicles were partially anchylosed. The left ear could only hear the watch on contact. There was a perforation of the upper segment of the tympanum on the line with the angle of the malleus.
>
> Keratitis had come on when the patient was fourteen years old, had lasted for several months, and was very serious, making him almost blind. The traces of this affection were still apparent.
>
> One of the knees showed a notable deformity with cicatricial bridles, a slight retraction of the leg, limitation of movement, and pronounced lameness. About the articulation, cicatrices of varying size and dimensions existed, evidences of periosteal abscesses and cutaneous ulcerations.

The patient had strenuously denied having acquired syphilis at any time, and it was only when Fournier suspected syphilis that he said he believed it was of hereditary origin, and that his family physician could give a clew to the correct cause of his present trouble. On referring to this gentleman, the following condition of things came to light:

1. That the patient's mother, when *enceinte* with him, had acquired syphilis from her husband.

2. That the patient shortly after birth showed various syphilitic symptoms, which were treated as such by the doctor.

3. That he was puny, and brought up with much difficulty.

4. That at the age of two years he showed the affection of the knee described above, which was chronic in its course, and of a serious nature, attended with multiple abscesses about the joint, exfoliation of bone, adhesions of the joint, and peripheric ulcerations, all of which finally yielded to protracted treatment with the iodide of potassium.

5. That he infected the nurse, who suckled him, with syphilis.

The patient recovered from the ulcerations of his penis under the use of iodide of potassium, iodoform, and baths.

While the case is particularly instructive as showing that symptoms of inherited syphilis occur late in adult life, it is also worthy of note that at the time these lesions occur they are single and of such character that they might not be referred to their true cause. If the surgeon be on his guard, and is a careful diagnostician, he will probably find traces of previous troubles which will put him on the right track, and enable him to give a correct opinion of the case. Just such an instance occurred in the history reported by Bulkley (Archives of Dermatology, 1878), which is briefly as follows. In the first case he was consulted in regard to a female patient, who was supposed to have lupus, but upon seeing her he at once suspected inherited syphilis.

She was twenty-three years of age, and was very much below the size which would be expected at her age. She was undeveloped, and had more the appearance of a girl from eleven to thirteen years of age, instead of twenty-three, although intellectually she was quite equal to her years. The forehead was square, rather prominent in the sides, and sunken in the middle. The teeth exhibited in a most remarkably characteristic manner the peculiarities recognized as belonging to hereditary syphilis. The upper central incisors were notched and greatly thickened. The other incisors were also malformed, were very small, and the canine teeth were curiously peg-shaped. The lower teeth were very small—not larger than those of a child eight years old. They stood separated, and were more or less irregularly placed.

Her history was that at four years of age she had an abscess under the right jaw; at five she had severe spasms on three occasions, remaining for hours without speaking. When twenty years of age she was under the care of the late Dr. Althof, of New York, for double vision, at which time she suffered with the eyes for three years. Her mother, also a very intelligent woman, said the patient never had any eruption on the skin but the present one, except a small spot on the inside of the right thigh soon after birth. This may have been a mucous patch. She gives no other history of the earlier manifestations of the disease. The eruption for which she consulted me appeared first during the preceding September, nine months previously. She then noticed a small swelling on the anterior surface of the lower third of the right arm. It was hard, and of a reddish color. She poulticed it; it broke, discharged, and has increased in size since, with the addition of new masses around it.

When first seen there was on the lower third of the right forearm an irregular-shaped mass of gummous induration, about three inches wide, and extending two thirds of the way around the arm. It was perforated in many places by points of ulceration and sinuses from which there appeared to be a moderate amount of discharge.

At times the pain was very severe in it, so as to prevent sleep. She had been variously treated by a number of regular and irregular practitioners ever since its first appearance, with no benefit, but, on the contrary, with a constant increase in its size.

The treatment generally consisted in local applications. On questioning the mother, I learned the following family history: She had had sixteen pregnancies, the first four resulting in healthy children, two of whom are living and healthy at thirty-eight and thirty-nine years of age. One child died at thirty-one years, and a boy at eight months, from natural causes. She then contracted a venereal disease, and had an eruption on the buttocks. She then began to have miscarriages, and ten dead-born children followed each other, all at nearly or about full term, with one exception. She says they would appear to die *in utero* about six days before delivery, when she would feel a shivering sensation pass over her.

Two years elapsed between the last stillbirth and the birth of the present patient, who appeared healthy, with the exception mentioned of a small eruption on the right thigh.

She was placed upon bichloride of mercury and iodide of potassium in small quantities, and in less than two months the lesions had entirely disappeared.

In this case, with the sole exception of the small spot on the thigh, there was a total denial on the part of both the patient and the mother of any lesions of the skin, and the first apparent one did not come on until the girl was twenty-two years of age. The trouble of the eye for which she consulted the oculist may or may not have been due to syphilis, but at any rate, supposing it was not, it is singular to mark that the teeth showed peculiarities which we recognize as belonging in the majority of cases to inherited syphilis, and, with such lesions remaining after, it is not at all likely that the child escaped during its earlier years without some other symptoms referable to its syphilis. The mere denial on the part of the patient and her mother goes for nothing at all, inasmuch as patients, even those of a fair degree of intelligence, are absolutely ignorant and stupid when it comes to the question of knowing symptoms or of giving a rational statement of previous disease.

LESIONS OF THE SKIN IN INHERITED SYPHILIS.

The lesions of the skin occurring in children who are the subjects of inherited syphilis vary in form and intensity, dependent upon how soon they appear after birth.

The congenital type is apt to be the most severe—that is, where the symptoms are present at the time the child is born, and milder when the lesions do not come on till some months after birth. Sometimes the fœtus is cast off before full term with macerated epithelium and evidences of pronounced alterations of the skin. At other times the child is carried to the full term and is born with pemphigus, in which the epidermis is raised over the entire body (in the form of bullæ), which is readily stripped off, leaving a red, excoriated surface beneath. Again, the child is born with a papulo-pustular eruption of the body, especially on the palms of the hands and soles of the feet, which desquamates and shows slight ulcerations beneath. But many syphilitic children come into the world apparently sound and healthy, and remain so for several months after birth, showing as the first evidence of their disease a macular or a papular syphilide of the skin. In those cases where the poisoning is profound, in which the child is born with a pemphigus or with a pustular syphilide, the mucous membranes are affected in a similar manner to the skin. The epithelium is stripped off from the buccal cavity and from the throat, leaving the subepithelial surfaces raw and denuded. If the child is born alive, there is frequently found a bulging of the forehead (hydrocephalus), excoriations about the angles of the mouth and about the anus, the respiration is impeded by lesions in the throat and mucous membrane of the nasal cavities, the voice is altered in volume and sound, the cry is stridulous and hoarse, the child is pale and wizened, having the appearance of premature age, and the body lacks the plumpness of infancy. Associated with this is an obstinate diarrhœa dependent upon lesions of the intestinal mucous membrane.

At the autopsy the viscera are found to be profoundly altered and are frequently the seat of infiltrations referable to an advanced stage of syphilis.

But, as has already been stated, the newborn child may present all the appearances of good health. The body is full and well nourished, the color is normal, the functions of the body are well performed, the cry is that of a child in good condition ; there is no snuffling, or any bulging of the forehead—in short, there is nothing to denote that the child is affected with syphilis. But after a few months the child's appetite begins to fail, it no longer suckles as well as formerly, nor does it seek the teat with its previous avidity. The cry is observed to become hoarse and squeaky, the child does not sleep as well or as soundly as it should, and it is peevish and irritable. With this condition of things, either simultaneously or soon after, the eruption is seen over the entire body, invading the face, the body and thighs, which is often overlooked, or, if noticed, is attributed to other causes. At the same time the mouth is observed to be sore, and to interfere with nursing. If carefully inspected, the mucous membrane is seen to be the seat of opalescent spots, slightly raised above the surface of the tissues and seated in the subepithelial layer. This is the lesion so often called "sprue" by nurses.

Macular Syphilide.—The eruption commences in the form of macules of the skin, which are not raised above the surface of the integument, of a shade varying from pink to a bright red, easily effaced on pressure, but returning as soon as the pressure is removed, desquamating rapidly, and, from the heat and moisture incidental to a baby's skin, quickly losing their epithelial layer. Especially is this the case in the folds of skin about the infant's neck and its genitals, where they assume the appearance of the moist secreting papules of the acquired variety, and constitute mucous patches of the skin.

Under treatment these macules rapidly disappear, the child resumes its former healthy appearance, the functions are properly carried on, and the child seems to get over its trouble. This improvement is deceptive, for in a short time the child presents evidence of a new eruption, or else (this more rarely) the macules return.

Papular Syphilide.—If the disease is progressing, the next outbreak of the skin occurs after an intermission varying from a fortnight to four or five weeks, usually the earlier period, in which the child's body shows a papular eruption seated principally on the buttocks, the face, palms of the hands, and the soles of the feet. This lesion is elevated above the surface of the skin, does not readily disappear on pressure, each papule is crowned on its apex with fine scales, the papules themselves being of the acuminate variety, closely grouped together, and seated upon a reddish, elevated base. The grouping of each patch is circinate, with sound skin in the center; sometimes the circular form is not complete, and the groups present irregular shapes. The tendency of these patches is to coalesce, without very characteristic changes, from single papules closely grouped together to broad papules which desquamate abundantly; they are prone to crack and become fissured, and, when seated at the angles of the child's mouth, are a constant source of pain every time it opens its mouth. This variety is most commonly met with on the palms and soles, and at the angles of the mouth. They bleed readily on the slightest motion of the skin covering these parts, and are very obstinate and rebellious to treatment.

Vesicular Syphilide.—Another form of eruption which has been described is the vesicular syphilide, which first appears somewhat as does the miliary variety of papule, except that the papule, instead of desquamating at its apex, becomes vesicular. This variety I have never seen myself, and, while not denying the possibility of its occurrence, I am somewhat inclined to think that a vesicular eczema has been mistaken for a syphilide.

In support of this view I shall quote a case which was presented by

M. Besnier at the Réunion Clinique Hebdomadaire de Médecine at the Hôpital St. Louis (Annales de Dermatologie et de Syphiligraphie, 1889), which is entitled "Syphiloide Vacciniforme Infantile."

The child's history is briefly as follows:

It was born at term on the 14th of October, 1888, of healthy parents. The child was put out to nurse, was raised on a bottle, the nurse herself being sound. The maternal history is as follows: Children—one girl died at twenty-two months, of diarrhœa, without any other accident, and never showed any lesions of the skin. The second, a boy, born a year later, now living at the age of five, and healthy. The third child, born three years afterward, aged twenty-five months, always in good health; and, fourth, the child which is the subject of the discussion. The father, forty years of age, was examined, and no evidence whatever of any syphilitic taint or lesion was found, either recent or old. The mother also shows no indications of syphilis. The child a month ago had a severe diarrhœa; eight days later the mother was invited to take back her child upon the advice of the physician of the locality, who declared it was affected with a contagious disease. The mother received it again on the 27th of February, 1889, in the following condition: The child, although emaciated, was well built, and showed about the labia majora throughout the whole extent and in the inguinal folds, a large number of flat, regular, circular, and oval papules of a red color, with a depression in their center, resembling syphilitic patches. These papules, some of which are isolated, are, however, for the most part acuminate, and form broad patches, regular in shape, with scalloped borders.

The same lesions are in the inguino-crural folds, a little more numerous on the left than on the right side. Upon the internal surface of the thighs, on a level with the folds formed by the skin, there exist on both sides similar lesions having the same characteristics as those found upon the vulva. There was nothing the matter with the mouth, and no lesions upon the face, the palms of the hands, or soles of the feet. There was no coryza, the liver was not large, nor were there any lesions of the viscera.

In the discussion which followed, extreme doubt was cast by both MM. Vidal and Fournier upon the syphilitic character of these lesions, and it was suggested that the lesions should be treated locally with Labarraque's solution and dusted with some inert powder. This was done, and the child was shown again on March 14th, seven days later, and the lesions had entirely healed up under the application of powdered starch and a careful isolation of the morbid surfaces. From this it would be exceedingly doubtful whether the lesions shown by M. Besnier were really syphilitic. It was probably one of those cases of vacciniform herpes, perhaps associated with eczema, not infrequently seen in children.

Course.—Miliary papular eruptions, although not particularly obstinate, do not disappear as readily as does the macular variety. It is slow in being absorbed, and leaves a stain behind which lasts for some little while after the eruption proper is gone. The lenticular (the broad kind), on the other hand, is very slow in disappearing, is rebellious to any but the most energetic treatment, and is quite prone to relapse. The infiltration of the submucous layer is oftentimes extensive and obstinate, and this eruption is the dividing line between the preceding mild lesions and those of a later or more advanced type; for it must be borne in mind that the manifestations of the hereditary late variety are essentially those of the late ulcerating kind (the so-called tertiary stage), which are seen in the acquired type, and betoken an advanced condition of the disease. These lesions are true gummous deposits, and are often exceedingly destructive in their course.

In the majority of cases, in the early stage of the disease, the child recovers from any active manifestations of syphilis for a time, provided the treatment has been efficient and prompt. This period of exemption may last for two or more years, until the age of five or six years is reached, when a relapse of a papular syphilide takes place, or else the next step is taken in the onward course of the disease, to wit, the pustular variety. This variety is most frequently to be seen about the face, the hairy scalp, the soles of the feet, the palms of the hands, and the legs. The lesions begin as small nodules beneath the surface of the skin, which quickly become raised above the surface, are filled with pus, which dries in the form of scabs, and these, becoming detached, leave an ulcerated surface beneath. When they make their appearance they denote a tendency toward the development of later lesions, and betoken an outbreak at the age of puberty, even if the child survive the present attack.

Late Syphilides.—These are the symptoms which occur upon the skin during the early stage of infantile syphilis; but there is one variety to which I shall call attention later, viz., the kind known as the hæmorrhagic variety. Before describing that, let us study the eruptions which take place during the stage known as *syphilis hereditaria tarda.* We now arrive at the late stage, or the period known as the tertiary, where the lesions begin in the deeper layers of the skin or cellular tissue, and are gummous in their nature. These are the types very often spoken of and written about as syphilitic lupus—a most unfortunate name. They are not so widely diffused over the body as the lesions just described, but are usually confined to certain portions. Fournier (Annales de Dermatologie et de Syphiligraphie, 1886) gives the seat of these lesions in fifty-three cases. In twenty-eight they occurred on the face; in one they occurred on the hairy scalp; in twenty-seven they occurred on the leg; in five they occurred on the buttock; in two they occurred on the foot; in five they occurred on the arm; in four they occurred on the forearm; in three they occurred on the hand; in six they occurred on the trunk; in one they occurred on the neck; in one they occurred on the breast; in three they occurred on the thighs; in four they occurred on the face; in three they occurred on the vulva; and in one case they occurred in the aperture of the anus.

Although it is seen that these lesions are found on all parts of the body, there seem to be certain spots where they are more frequently met with than upon others.

The face is the special seat of predilection, after that the legs; and Fournier calls attention to the fact that it is the anterior portion of the leg which is most frequently attacked. When the face is attacked, he says the nose is the seat of predilection, and I should add the cheeks, for, so far as my experience goes, the cheeks are as frequently attacked as the nose, either concomitantly or alone. Fournier, however, says the nose is the seat of predilection, and out of twenty-eight cases where the face was attacked, the nose was the favorite seat in eighteen, and was severely attacked. These are the cases so often considered as lupus, and reported as cases of lupus cured by the use of the iodide of potassium.

Course.—The advent and progress of these lesions are noteworthy as coming on slowly and insiduously, without pain, or any premonitory symptoms. They begin as tubercles, or groups of tubercles, deeply seated in the cellular tissue, which break down, often after long duration, and present open ulcerations, or else are covered with adherent crusts, which, when removed, show deep ulcerations beneath. These ulcerations extend in a serpiginous manner, cicatrizing at one point and extending at another, and refuse to heal up under the usual methods of treatment directed toward the cure of lupus, or rodent ulcer. Iodide of potassium is the only thing which seems to be of benefit. The course of these lesions is essentially a slow one. When they heal they always leave a cicatrix behind them, which is depressed beneath the surface of the surrounding tissues, and is usually recognizable as due to syphilis.

Another variety remains to be spoken of, one which has been described by many authors (Smith, Jenkins, Von Barensprung, Epstein, Ritter, Petersen, *et al.*) under the name of *syphilis hæmorrhagica neonatorum*. This variety of eruption usually occurs early in the life of the child, often at birth or very shortly after, and is associated with other evidences of profound poisoning from syphilis. It may be accompanied by pemphigus, in which cases the bullæ are filled with a bloody serum, or it appears as hæmorrhagic effusions beneath the skin. This may occur as isolated points or as a diffuse purpura, and is accompanied by bleeding from the umbilicus, hæmorrhage from the nose or mouth, and bloody stools due to hæmorrhage from the intestines. Associated with this lesion, gummous infiltrations of the viscera, of the liver, spleen, and lungs, are found upon autopsy. The infants succumb under the loss of blood and the depressing effects of the syphilis.

Mraček (Berliner Klinische Wochenschrift, 1886) gives the history of nineteen cases of this kind, in which all the children died at periods varying from half an hour to forty-eight hours. On autopsy, vascular lesions were found in the viscera, with sanguineous effusions (Mraček, Viertelj. f. Derm., etc., 1887).

Richards (Indian Medical Gazette, 1884) records a case of gangrene of the forearm occurring as the result of hereditary syphilis; but I regret that I have been unable to verify this case of Richards by reference to the journal in which the report appeared, and so I merely quote it as having occurred.

Zantiotis (Gazette Hebdomadaire de Médecine de Paris) gives an account of two cases of subcutaneous phlegmon as resulting from hereditary syphilis, which are very interesting.

In the first case the child was born on the 15th of June, 1885. On the 2d of July it broke out with an eruption of pustules, and at the same time the left arm became red and swollen. On the 5th of July, at the lower and internal aspect of the arm, near the articulation of the elbow, an abscess formed, which broke spontaneously.

On the 6th of July, Zantiotis saw the child. Its physical condition was fair. There was an ulcer the size of a two-franc piece at the site of the abscess (a little larger than a quarter of a dollar). The tubercular process was laid bare, but was not carious, and pus flowed from the undermined integuments. On the body were vesicles, papules, pustules, and tubercles, but none on the face or ears.

On the 8th of July a second brachial abscess appeared, which was opened and gave vent to laudable pus. From that date forward fifty abscesses, varying in size, broke out over the body and head, and were finally cured, as were the cutaneous lesions, by antisyphilitic treatment. (The parents denied having had syphilis.)

The second case was similar to the one just given, except that it terminated fatally, and unfortunately no autopsy could be obtained.

AFFECTIONS OF THE MUCOUS MEMBRANE.

The mucous membranes of children, the subjects of inherited syphilis, are attacked in a manner similar to the affections of the skin; the division being made between those affections occurring early in the course of the disease (shorly after birth), and those which occur during the later stage, known as *syphilis hereditaria tarda*. During the earlier stages, if the child be born with evidences of the disease, the affections of the mucous membrane correspond closely to the lesions found upon the skin.

If the child be born with pemphigus, the mucous membranes show a loss of their epithelial covering. They have a red floor, with but slight, if any, ulceration. This condition is usually seen upon the mucous membranes of the tongue, mouth, fauces, and even far down in the pharynx, producing difficulty of respiration and more or less alteration of the voice. If the disease has not progressed so far, and the child is born with a papular or papulo-pustular eruption, the mucous membrane of the buccal and faucial cavities show ulcerations, from which the epithelium has been stripped, with edges more or less excavated and a grayish or yellowish-gray floor.

The child's voice becomes husky and stridulous, respiration is impeded and deglutition difficult. The less advanced the disease is the less marked are these symptoms, and in those children in whom no symptoms occur at birth, the mucous membranes of the mouth, throat, and tongue present no lesions whatever. But later on cutaneous manifestations make their appearance, slight abrasions are found upon the lips, the tongue, and about the angles of the mouth, which invade the skin, producing the fissures which are of such frequent occurrence in cases of infantile syphilis. These usually come on slowly, and the first thing which calls the physician's attention to the child's condition is a difficulty in breathing and an alteration in the voice, which is peculiar to this disease, and once heard can never be mistaken for anything else. The child refuses to nurse as readily as heretofore, and, when nursing, experiences more or less difficulty in seizing the nipple, owing to the irritation produced by these mucous patches of the mouth and lips. Concomitant with these symptoms, or appearing shortly after them, the nasal mucous membrane becomes affected. A thin, ichorous discharge, rapidly becoming purulent, flows from the nose, which upon exposure to the air becomes dry and forms crusts. When these crusts are removed, superficial excoriations and ulcerations are found beneath.

This condition goes on until the child, exhausted by its efforts at respiration, becomes worn out and sinks from marasmus, or malnutrition in consequence of lesions occurring in the stomach, in the intestinal tract, or in the larger viscera of the body.

If the child under treatment survives this attack and lives through the first four or five years of extra-uterine life, it begins later on to show more or less pronounced ulcerations of the throat and of the posterior nasal cavities in the shape either of a chronic catarrh or of an infiltration of the soft parts, resulting in ulceration and destruction of tissue.

These changes come on slowly, are attended with very little physical pain, and are only noticeable from the impediment to respiration or deglutition which occurs; but the lesions rapidly break down, and when this happens, as is frequently the case in the soft palate, on the anterior fauces, or upon the posterior pharyngeal walls, the results are deep-seated ulcerations, great loss of tissue, and destruction of important parts.

When the ulcers heal up they produce oftentimes important modifications of these organs, going so far as to cause stenosis of the posterior nasal cavities and of the pharynx. These are the cases which, among the older writers, were considered as strumous ulcerations which failed to heal up except under the administration of the iodide of potassium or small doses of mercury; and it is curious, in this connection, to remark that such a careful observer as Sir Astley Cooper noticed this fact without ascribing it to its true cause; and the famous sirup which in the last century went by his name, owed its efficacy to the fact that mercury was one of the principal ingredients in its composition.

As the child becomes older it may present no further evidences of syphilis until the age of puberty is reached. Then a recurrence of the previous symptoms may take place, or else the disease progresses to a later stage, in which not only the mucous membrane covering the hard parts, such as the hard palate and the gums, may be attacked, but the periosteum also becomes involved; this point, however, is referred to elsewhere. When the mucous membrane covering the hard palate or the gums is attacked, it usually commences as an infiltration of the parts, attended with no signs of inflammation or pain. It becomes detached from the bone, and usually develops superficial ulcerations which are quite extensive, leaving the bone covered with its periosteum beneath. It is very rare, however, that only the mucous membrane is invaded, for in nearly all these cases it is accompanied with periostitis, which leaves denuded bone beneath it as soon as ulceration ensues. Coincident with these lesions periostitis of the nasal bones ensues, which, after necrosis, causes sinking in of these bones and flattening of the nose.

The mucous membrane of the pharynx and larynx is frequently attacked as far as the bronchi, and even the smaller bronchial ramifications of the lungs, as well as the mucous membrane of the stomach. These commence first in the form of catarrh of the bronchial tubes, producing what is often known under the vague term of *syphilitic catarrhal bronchitis.* The symptoms which occur in this variety of bronchitis are those which occur in bronchitis apart from this cause, to wit, increased expectoration, some dyspnœa, and but very slight, if any, cough. Fever is usually absent. The remedies generally given for the relief of ordinary bronchitis in these cases seem to be of little avail, and iodide of potassium is the only remedy that is of any service.

AFFECTIONS OF THE LYMPHATICS AND GLANDS.

One set of organs in hereditary syphilis has received but slight attention until within the last few years, and that is the affections of the lymphatics, not only the superficial but the deep vessels. These were first spoken of in 1804 by Lamauve in his edition of Mahon, Traité des Maladies Syphilitiques des Femmes en Couche et des Nouveau-Nés, in which, when describing syphilis of children, he speaks of an engorgement of the lymphatics.

In 1810, Bertin (Traité des Maladies Vénériennes chez les Nouveau-

Nés, etc.) described an inguinal lymphangitis in children who are the subjects of inherited syphilis where the symptoms occurred sometimes after the disappearance of other lesions. The glands are indurated, and resemble scrofulous engorgement.

Hutchinson (Medical Times and Gazette, 1858) reported the case of a syphilitic child in whom the bronchial glands were infiltrated with fibrinous deposits similar to those found in acquired syphilis.

Von Bärensprung, in his work (Die hereditäre Syphilis, 1860) *passim*, describes an enlargement of the mesenteric glands, and of the glands about the spleen and the broad ligament of the liver.

Mollière (Annales de Dermatologie et de Syphiligraphie, 1870) gives an account of enlargement of the inguinal, the prevertebral, and the mediastinal glands in the syphilitic child; Casati, of Milan, Campana, of Naples, Rivington, Lancereaux, Laschewitch, and Doyen have also called attention to this condition of the glands in hereditary syphilis. The latter, in the Archives Générales de Médecine, gives the record of eight cases of inherited syphilis, in four of which lymphatic enlargements were observed.

The glands involved were the mesentery, lumbar, iliac, hypogastric, inguinal, thoracic, mediastinal, axillary, and carotid—in fact, all the abdominal and thoracic glands. Their tissue was hypertrophied, and they were of a grayish or yellowish-white appearance, and under the microscope were found to be infiltrated with cells of a yellowish or grayish-white hue. In no case, so far as I am aware, has there been any actual breaking down of the tissue, except where the glands lie superficially and close beneath the integument.

The *thymus gland* is the one to which most attention has been called in this variety of disease, and although Paul Dubois is the one generally credited with having first called attention to it in 1850, it really was observed twenty-five years earlier, in 1825, by Cruveilhier and Veron.

The latter writers, however, merely called attention to the enlargement of this body in cases of hereditary syphilis. Dubois was the first one to describe it *in extenso*.

Frequently this gland is found of normal size and not differing externally from a healthy gland, but upon slight pressure it exudes a yellowish-white, viscid, semifluid, alkaline substance, which under the microscope shows abundance of pus-cells. Upon section, the tissue of the gland is found to be denser than normal, with scattered deposits of fibrinous exudation.

These exudations may be diffused generally throughout the substance of the organ, or they may be circumscribed into deposits varying from the size of a bean to that of an English walnut.

If the organ is infiltrated throughout its substance, the exudation which takes place is that described above, as of a yellowish-white, viscid fluid.

When it is circumscribed, however, the infiltrations usually break down in the form of gummous infiltrations, or else as abscesses, which under the microscope show increased cell growth with abundance of pus-cells.

AFFECTIONS OF THE NAILS.

Onychia in inherited syphilis appears in two forms. The first, which comes on early in the course of the disease, consists in an inflammation of the matrix, is associated with the early cutaneous lesions about the nail, and rarely becomes pustular. The second occurs later on, and is a genuine ulceration of the matrix, or it may begin at the side of the nail, which is altered in texture, becomes raised, with destruction of its bed. Sometimes this process is repeated several times before a new nail is finally reproduced, which is often of irregular growth and misshapen.

Mr. Stephen Paget (Lancet, February 2, 1889) showed a case of disease of the nails in inherited syphilis similar to what is figured by Mr. Hutchinson in his Clinical Manual on Syphilis. All the nails were affected, hands and feet alike; they were thickened, discolored, and pinched. Some were already shed. The posterior part of each nail was of a yellow tint, but there was no discharge from under them, no blisters around them. The baby, four months old, was the first living child after two miscarriages, and had suffered from sores at the anus and a papular rash on the chest. There had been snuffles, but no history of sore mouth. A slight attack of pemphigus and some exfoliation of skin had been noticed. It rapidly improved under treatment.

Another singular affection of the nail is of the dry variety, and is described by Van Harlingen (Philadelphia Medical News, 1883), in which the nails of the fingers and toes were implicated. The case is that of an infant, the subject of congenital syphilis, in whom, when three weeks old, the nails began to show a yellow discoloration in the center, and to take on an arched shape as if shrinking together from the side. The nails of the feet were affected first, later on those of the hands.

Examination showed the nails of both fingers and toes to be alike affected, being partly curled in on their lateral edge, until they occupied less than half, or scarcely even one third, of the entire width of the nail-bed. Growing out some distance beyond the ends of the fingers and toes, the nails bent over in a clawlike shape so as to resemble the claws of a duck or other animal—a resemblance made stronger by the dark, brownish discoloration of the nails.

The surface of the contracted portion was furrowed by fine, transverse markings, while the proximal portion of the nail-bed from which it sprung is thrown up into rugous folds. The nail-bed alongside the contracted nail was somewhat ruffled and slightly brownish. The diseased nails were not thickened and were not in any way misshapen, except for the perfectly uniform changes which are described, which involved all the nails in precisely the same manner.

Diday, in his work, Syphilis des Nouveau-Nés, quotes Guérard (Journal de Siebold, T. X.) as follows: "I have seen, in the newborn child affected with syphilis, the nails of the hands and feet gradually become atrophied, grow longer and narrower in appearance, falling off at last to make way for more healthy nails, which underwent the same process; and this happened three times in succession before really sound nails remained.

ALOPECIA.

Alopecia is another affection of the appendages of the skin, which occurs in the heredo-syphilitic child, and is of two kinds. The one takes place early in extra-uterine life; the other, with the manifestations of the late variety. The first kind is general, attacking the hair of the head and eyebrows, which are scanty and readily fall out, leaving the child bereft of hair, or else the hair fails to grow readily as it should.

The second variety is either complete, or, as is most frequently the case, confined to certain portions of the head, occupying the fronto-parietal regions, showing itself in bands more or less extensive in the antero-posterior direction. It is seldom seen on the vertex, either frontal or occipital. In bad cases the eyebrows are scanty, sometimes entirely wanting. This form of alopecia is sometimes attended by epithelial pigmentations. Mercurial treatment will arrest the progress of the baldness, but it will not renew the growth of the hair. The seat and extent of the baldness distinguish it from other forms of alopecia which occur in children.

AFFECTIONS OF THE GENITAL ORGANS.

The Testicles.—Affections of the testicles in inherited syphilis have been described by Henoch (Deutsche Zeitschrift für praktische Medizin, 1877), and by Hutinel (Revue Mensuelle de Médecine et Chirurgie, 1878), in which the testicle was enlarged, hard, and painless. Infiltration occurs in the body of the testis as a rule, and not in the epididymis. This nearly always escapes; but an interesting case of exception is reported by Comby (Annales de Dermatologie et de Syphiligraphie, 1889), to which I shall refer further on.

In the seven cases observed by Henoch, four showed lesions of both testes, and in three the left one only was affected; the children ranged from three months to two and a half years old.

The infiltration commences about the periphery of the arterioles of the testis, and is followed by increased cell-formation and general infiltration of the organ. This is more common in the circumscribed variety, which appears in the form of small nodules set in the body of the testis, and which usually indicate fatty and granular degeneration.

In the diffuse variety the seminiferous tubules disappear by compression, and the whole organ is converted into a hard, fibrinous mass; the progress of the disease seems to be divided into three stages: first, an exudation about the vessels; second, an infiltration and thickening of the interstitial tissue; and, third, strangulation and obliteration of the seminiferous tubules.

The case of *syphilitic epididymitis* mentioned above, as reported by Comby, is so interesting that I shall give it here in full:

At the Clinique des Médecins de l'Hôpital St. Louis, in April, 1889 (Annales de Dermatologie, etc., for the same year), M. Comby presented a small boy, aged six weeks, who for five or six days previously had shown an abundant eruption occupying the forehead, the circumference of the nates, the anal region, the thighs, and other portions of the body. This eruption was composed of circular papules, which were for the most part eroded, and presented the most typical example of mucous patches of the papulo-erosive variety of syphilis. Moreover, on examining the testicles of this child the left one was found perfectly healthy, but the right one was augmented in size, especially at the epididymis, which was large, nodulated, and hard.

The mother of the child, aged twenty-four years, is healthy, and declares that she has never had syphilis. The father, aged twenty-six years, gives a history which admits of no doubt. The treatment prescribed was daily inunctions of mercurial ointment, together with sublimate of mercury baths, and later the sirop de Gibert.*

In the discussion which followed, M. Fournier considered the case of extreme interest, inasmuch as it demonstrated that the epididymis, to the exclusion of the gland itself, could be the seat of syphilitic lesions of congenital origin. Up to the present time only lesions of the body of the testicle had been noticed in heredo-syphilitic sarcocele.

Affections of the testis, apart from syphilis and tuberculosis, are so rare in children that when they occur they may be always ascribed to either of these two causes; and in syphilis the infiltration which occurs, the enlargement of the testis proper, the rarity with which the infiltration breaks down, and its slow course, mark pretty clearly the dividing line between these two affections.

The penis in grown-up subjects of inherited syphilis is often found small and undeveloped in size, and the growth of hair upon the pubes is scanty. There is feeble virility, and the seminal fluid is found to be either wanting in spermatozoa or else they are very few.

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* The sirop de Gibert is made up of the biniodide of mercury, the iodide of potassium, simple sirup, and water.

In women the arrest of development is quite as marked. The genitals are in an undeveloped condition, the mons veneris is scantily furnished with hair, the vagina is small and narrow, rather resembling the vagina of a young girl than a grown-up woman, and menstruation is much delayed; indeed, is sometimes absent, as in the case reported by Lancereaux (Traité de la Syphilis).

The patient, a woman of forty-one years of age, never menstruated, and at the autopsy the following condition of things was found:

The genital organs were not more developed than those of a girl of ten years old. The ovaries were rudimentary and showed no Graafian vesicles, and the vagina was so narrow as to have rendered sexual intercourse a physical impossibility.

In cases where menstruation is never established, the uterus is found to be in a rudimentary condition, and where the ovaries are undeveloped we need look no further for the cause of the absence of the catamenia. The ovaries are sometimes attacked with subacute inflammation, as has been described by Parrot.

In common with the rest of the genital organs, the *mammæ* also share in the lack of development. Schwimmer gives the details of one case in which the mammæ were scarcely developed, the genital organs were completely atrophied, the mons veneris was almost devoid of hair, the hymen was intact, and the vagina was very narrow, scarcely admitting the finger. The patient presented the appearance of a girl of fourteen. The catamenia, in this case, were said to have appeared only once, at the age of twenty-one.

DIAGNOSIS, PROGNOSIS, AND TREATMENT OF HEREDITARY SYPHILIS.

Diagnosis.—The diagnosis in cases of congenital and hereditary syphilis may be divided into two groups, those pertaining to the earlier stages, which are exhibited during infancy, and those of the late stage, which are exhibited during childhood, together with early and late adult life. In each of these the diagnostic points differ very materially.

Oftentimes at birth, or during the first few months of the infant's life, no symptoms whatever of the disease may be apparent. The child is born, to all outward appearances, perfectly healthy; but after a few months, in the larger proportion of cases before the lapse of six months, the child begins to show signs of ill health, loses flesh and strength, becomes peevish and irritable, and oftentimes refuses to nurse. Shortly afterward an eruption makes its appearance on the body, which is sometimes macular, sometimes maculo-papular; at the same time the child's cry differs from its usual healthy sound, becoming hoarse, rasping, and uncertain; and if an examination of the mouth and upper part of the fauces be made, the mucous membrane covering these parts is found to be the seat of opalescent exudations, which sometimes break down and become converted into superficial ulcerations. At the same time the nose exudes a thin, ichorous, highly irritating discharge, which, on exposure to the air, dries in the form of thin, yellowish or brownish crusts. The eruption, in its earlier stage, covers the entire body as well as the face, and is of a pink or reddish color, which rapidly becomes covered with thin, fine scales. Upon those portions of the body, when the skin is thin, especially about the axillæ, the genito-crural folds, the cleft of the nates, and popliteal spaces, these maculo-papules become moist, secreting a thin fluid, and are not covered with scales. These secreting papules are known under the name of mucous papules of the skin, and are akin to similar lesions which occur upon the mucous membrane of the mouth and throat.

Concomitant with this form of eruption, or immediately following it, bullous eruptions occur on the palms of the hands and soles of the feet, and the bullæ, at first filled with a thin, serous fluid, rapidly become purulent, coalesce, and attain to an enormous size. This is the so-called *pemphigus syphiliticus neonatorum*, a form of disease which may sometimes be apparent at the birth of the child. Under treatment, these lesions yield rapidly, providing they have come on some time after birth, and then the child may enjoy for several months entire immunity from syphilitic manifestations. If, as sometimes happens, the child is born with evidences of its disease, the lesions most apparent are those of the bullous variety; and associated with these bullæ are lesions of the internal organs, the lungs, the liver, the kidneys, or the spleen, which belong to a more advanced type of the disease, and which nearly always proves fatal to the newborn child.

Associated with these external lesions, the appearance of the child indicates important and curious modifications. It loses its usual healthy appearance; it no longer presents the full, robust aspect of a healthy child, but becomes emaciated and wizened, having the appearance of premature senility, at the same time exhibiting curious fissures around the angles of the mouth, due to the presence of mucous patches of the cheek or secreting papules of the chin. Care must be taken, in making the diagnosis of these various lesions of the skin, not to mistake them for cases of simple eczema, or for symptoms resulting from defective nutrition, dirt, and bad hygienic surroundings. Besnier (Bulletin Médicale, 1887) has called attention to lesions occurring in infants which, while not syphilitic, bore a close resemblance to the syphilides, and cites one case which is extremely interesting, and the details of which are as follows:

The case is that of twins a few weeks old, who were nursed by their mother in part and partially brought up on the bottle. They presented the appearance of senility, were emaciated, cachectic, and showed upon the tongue, the lips, and the ano-genito-crural folds erythematous lesions with multiple excoriations. The mother, herself of sickly appearance, was the possessor of a semilunar fissure of the breast, and had in the axilla of the same side upon which the fissure was seated a movable and indolent glandular enlargement. Besnier showed that these lesions, both in the children and the mother, were not syphilitic. In the children the labio-buccal lesions were not elevated, as is the case in the syphilitic lesions. Their base was erythematous; there was no evidence of a proliferation; they were seated only on the tongue and the lips, and were the same in point of position in both children. The nostrils, nasal fossæ, naso-labial commissures, and the eyelids were intact.

These lesions were due to neglect, to a lack of cleanliness, and to the fact that the milk used in the nursing bottle had become altered by fermentation. The lesions of the genito-crural folds and about the anus were due also to a lack of cleanliness, and were more of the character of erythema intertrigo than of true syphilides. The mother's lesions, Besnier showed, were not syphilitic: first, because when this fissure appeared on the breast the children were already suffering from the buccal lesions which had been described; second, she had had similar symptoms when she had nursed other children; and, third, the appearance of the fissure resembled what is seen in eczema of nursing women, and did not look like a chancre of the breast.

Acting upon the belief that these were not syphilitic lesions, Besnier instituted an exclusively local treatment, consisting of cleanliness, disinfection of all napkins used by the children, cleansing the lesions in both the mother and children with borated water, dressing the ulcerations with a five-per-cent borated preparation of vaseline, and instructing the mother as to the quality and quantity of the milk to be given to the children. In eight days a cure of all the symptoms in both mother and children took place.

This case serves to show that lesions may occur in children, which, so far as their general appearance is concerned, very closely resemble syphilides, and which may mislead the surgeon, unless care and attention are given in the examination, and in the history of both children and mother; they yield to local treatment, and have nothing at all to do with syphilis.

When the lesions are due to syphilis, if the treatment be efficient, these lesions, as a rule, entirely disappear, and the child's general condition improves, so that it regains a fair amount of health, which may last for several months, to be followed later on by a return of the cutaneous or mucous symptoms, or by a more advanced stage of the disease.

One point should be carefully borne in mind, and that is, that the earlier lesions may entirely disappear and leave no trace behind them; so that if subsequent manifestations at the age of puberty, or even later, occur, they may be mistaken for the first symptoms of the disease, and the case is then regarded as one in which the syphilitic manifestations did not take place until several years after birth. This view, in my opinion, is a mistaken one, for I believe, in all cases where the later lesions occur, earlier manifestations have been present which have entirely disappeared, and that the late lesions were not the first ones. I am inclined to think that all lesions which occur after the first five years of an infant's life should be classed among those of a late type, for the earlier lesions always make their appearance within that length of time; and, indeed, in the larger proportion of cases, within the first twelve months.

The symptoms which have been classed together under the name of *syphilis hereditaria tarda* are those which in the acquired type would be characterized as the late or so-called tertiary syphilis, viz., diseases of the eye and ear, diseases of the teeth, diseases of the bones, of the nervous system, and ulcerating lesions of the skin and mucous membranes. To present a typical picture of a person who is the subject of inherited syphilis, I can not do better than quote the words of Augagneur (Étude sur la Syphilis Héréditaire Tardive):

"Had I in a few words to present the ideal, clinical type of late hereditary syphilis, I should select a young girl, eighteen or twenty years old, whose eyes should present traces of parenchymatous keratitis; the teeth should be eroded and crescentically notched, at the same time they should be small and irregular; the hearing should be partially or totally lost in consequence of frequent attacks of otorrhœa; the genitals, possessing all the attributes of virginity, should be small; the mons veneris and the axillæ should be smooth; the mammæ without prominence; and menstruation should scarcely be established. Add to these all the tertiary lesions you please, and you will have before you a complete picture of late hereditary syphilis. . . . To the trilogy of Hutchinson—interstitial keratitis, defective incisors, and otorrhœa—I propose to add two other signs: general congenital atrophy and general arrest of development."

It is this peculiar arrest of development, conjoined, of course, with other symptoms, which serves to attract the surgeon's attention to the character of the lesions which may be presented to him, whether they be of the skin, the bones, or the nervous system. The patients nearly always present the appearance of being much younger than they really are, so far as stature, mental power, and physical development are concerned; and when, in addition to these, the appearance of the teeth or lesions of the eye are taken into consideration, the surgeon may often arrive at a tolerably accurate diagnosis, notwithstanding the absence of all previous syphilitic history, either in the individual himself or in his parents. As I have already pointed out, no single lesion can well be depended upon absolutely in making a diagnosis, but the surgeon should take all the symptoms together, and notably those which point toward a defect in or arrest of development. In some cases, however, the patients may present no signs whatever of an arrest of development. They may, on the contrary, be of good growth, of fair mental power, and, so far as their general appearance is concerned, may not lead the surgeon to suspect inherited syphilis. The character of the lesions themselves, then, may in the main be depended upon; and if they belong, as they nearly always will, to a late or an advanced type of the disease, the question may be fairly entertained whether the lesions are not those of an acquired rather than a hereditary type; and it is upon this point I wish to call more particular attention. A robust patient may come under the surgeon's observation for some ulcerating lesion of the skin, some necrosis of the bones, or some affections of the testicles, which the surgeon, if left to himself, would be inclined to ascribe to the acquired type of the disease, were it not for the fact that the patient denies absolutely having contracted syphilis at all. So far as the appearance of the patient is concerned, there is nothing to induce the surgeon to positively decide in favor of hereditary disease; and if in cases where symptoms to which attention has been called are absent, I think the surgeon is justified in regarding the case as one of acquired rather than hereditary type. And it is in just such a case as this, where all evidence of an arrest of development is entirely absent, that the surgeon should be justified in rejecting the idea of hereditary syphilis.

Prognosis.—The prognosis in cases of inherited syphilis is generally bad for two reasons: first, because the larger proportion of children born with this disease die within the first year of extra-uterine life; and, second, because those who survive until puberty are debilitated and readily succumb, if not to their inherited disease, to intercurrent affections, which under ordinary circumstances would not prove fatal.

The table on page 631, containing the records of the births of syphilitic children at the Moscow Hospital in Russia, from 1860 to 1870 inclusive, with deaths from that cause, shows how deadly the disease is in children.

From those statistics it will be seen that the highest percentage of mortality is eighty-two; the lowest, sixty-three. Calling it, in round numbers, a general average of seventy per cent, it is very evident indeed that inherited syphilis is a fatal disease.

Suppose that the child survives the first ten or twelve years after birth, it then arrives at a period where it is peculiarly open to attack from the symptoms of inherited disease of a serious nature, such as the lesions of internal organs, of the lungs, kidneys, and liver, or from exhaustion consequent upon attacks of ulceration of the bones, or of hemiplegia and paraplegia; and, even supposing the child to be fortunate enough to recover from these symptoms, if it be affected with intercurrent disease, the chances of recovery are very small, because its powers of resistance have been continually undermined by the destructive tendencies of its inherited disease. Hence, it may be said that the prognosis in cases of inherited syphilis is bad, and that probably very few children born with this disease survive beyond the period of puberty.

Treatment.—Various methods of treatment have been instituted for the relief and cure of inherited syphilis, and they may be divided into two broad groups—indirect and direct treatment. The first consists in the introduction of remedies into the child's stomach through the medium of the milk of the mother or nurse; and the second, where the drug is given to the child directly by the mouth or through the skin.

The *indirect method* is usually employed in this manner: The nurse or the mother is put upon an active mercurial treatment, under the belief that a certain proportion of the drug will be eliminated through the milk, and that in this way the child will be able to receive its medicine in sufficient amount to bring about a cure. But an examination of the milk of persons who have been treated, even up to the point of salivation, shows that but little, if any, of the mineral is excreted through the milk, and children who have been put upon this method of cure have received scarcely any benefit. As regards this method of treatment, therefore, we may say that it is of no practical value, and should never be resorted to where other and more efficient means can be adopted.

The *direct method* is the only one that offers a fair chance for the child's recovery, and it may be instituted in one of two ways—either by administering the drug to the child through the mouth, or by the medium of the skin. Of these two methods the administration by the skin is the one to be preferred, and the plan most worthy of adoption is to spread from one to two drachms of mercurial ointment upon a cloth, which shall be bound around the child's body, and should extend from the axillæ to the hips, care being taken that the axillary and genito-crural folds shall not be irritated by the mercurial ointment. This should be worn by the child for two or three days, when it should be removed, and the child's skin gently washed with warm water and soap. A fresh supply of ointment should be applied to the same cloth, which is then again bound upon the body of the child. This is better than making inunctions upon the child's trunk, or upon the limbs, as it is less likely to produce eczema, or to irritate the skin; the warmth of the child's body causes rapid absorption of the drug; it does not interfere with the child's nursing, nor is it so apt to derange the stomach or intestines, as is the case when the drug is given internally. It must be borne in mind that syphilitic children generally tolerate mercury very well, and will take quite large amounts without showing any of the deleterious effects of the drug.

If it should be considered advisable to give mercury by the mouth, it may be administered either as a powder—the ordinary pulvis hydrargyri cum cretâ—which may be deposited upon the child's tongue, and will readily be taken up, or it may be given in the form of the bichloride, in doses of from one one-hundredth to one fiftieth of a grain, rubbed up with sugar of milk, or administered in sweetened water or milk and water. The powdered preparations are far the best. Sublimate baths are sometimes administered, but the effect is frequently to produce debility, and they must consequently be used with caution in the case of infants and young children.

Hypodermic medication, in the treatment of infantile syphilis, has been suggested and used by some syphilographers, but it is not to be advised on account of its producing severe pain, besides serious and sometimes alarming abscesses. In addition, the treatment by the hypodermic method is longer and more uncertain than the inunction or other methods, and it presents no advantages which would recommend its use in preference to the forms of medication already suggested.

In the earlier months of treatment iodide of potassium is seldom, if ever, called for, and its administration should be reserved for lesions of a later type, more especially those of the ulcerative variety.

Under this method of treatment the child will often recover from its earlier symptoms, especially if they have been of a mild type; and even in cases where the lesions are tolerably severe, a proper and thorough course of mercurials directly administered offers the best chance for recovery. In the lesions of the late type, iodide of potassium may be administered, either alone or conjointly with mercury, in the same manner in which it is used for acquired syphilis; and it is in these cases that the iodide of potassium will oftentimes produce the most brilliant and satisfactory results. To be of any service, however, the drug should be given with quite a free hand, for these later lesions of syphilis are oftentimes extremely rebellious, and will not yield to small doses of the salt.

From ten to twenty grains at a dose, large as the amount may seem, are of more service than two, three, or five grain doses. And the surgeon should be prepared to increase the dose as circumstances require it, or to suspend its use if toxical symptoms ensue; but, as a rule, syphilitic children and young adults suffering from this type of disease tolerate the iodide of potassium remarkably well.

In addition to this, mercury may be administered either in the form of the protoiodide, which is the one best borne, or of the bichloride; this latter preparation is, however, so often apt to disagree with the stomach, and to produce diarrhœa and other intestinal disturbances, that its use had better not be resorted to unless the other preparation of mercury, the protoiodide, can not be used.

Local Treatment.—In addition to the constitutional treatment, local treatment will very often be required for the relief and cure of some of the symptoms. In cases where the mouth and tongue are attacked with mucous patches, local applications of a weak solution of nitrate of silver, from one to five grains to the ounce, may be applied daily in the case of infants. As gargles and mouth-washes can not be used in these cases, in addition to the employment of nitrate of silver, the lesions may be lightly penciled over with a preparation of tannin and glycerin, in the proportion of ten grains to the ounce, or with a weak solution of sulphate of zinc, one to three grains to the ounce of water. This should be done several times during the day, and the infant's mouth kept as clean as possible. In excoriations and ulcerations of the nasal fossæ, the same methods may be employed as are used in lesions of the mouth and tongue. In cases where ulcerations are present on the body, if there be no sign of the extension of the ulceration beneath the crust which covers it, it is better, perhaps, to leave the crust in position, as it makes the best dressing for the ulceration beneath; but if there be any signs of extension, the crust should be gently detached by poulticing or by soaking in warm water, and the ulcerations themselves touched with a weak solution of nitrate of silver, of the strength above advised, and dressed with a mercurial ointment diluted with an equal proportion of vaseline.

In cases of pemphigus the bullæ should be emptied of their contents, and if the epidermis covering them has become detached, they should also be dressed with the diluted mercurial ointment; but, as a rule, very little local treatment will be required for these lesions, the bullæ being seldom attended with much, if any, ulceration. Lesions about the genito-crural fold and the anus should be kept clean and dry. They should be repeatedly washed, and the napkins which the child uses should be frequently changed. After the parts have been washed and thoroughly dried they should be freely powdered over with calomel and bismuth, in the proportion of one part of calomel to two or three of bismuth, and after each change of the napkins the powder should be gently removed by washing and reapplied. If the mucous patches at this point show signs of ulceration or breaking down, they should be touched gently with a solution of nitrate of silver, in the proportion of five or ten grains to the ounce of water; but in the larger proportion of cases, if the parts are kept clean or dry, very little else is required.

In the later stages of the disease, particularly where ulceration is present, the local treatment oftentimes plays an important part. Where ulceration of the soft palate or of the throat is present, the best application is that of the nitrate of silver, of the strength of twenty or thirty grains to the ounce, applied every second or third day; and the parts should be frequently gargled with solutions of alum, tannin, sulphate of zinc, or myrrh. This latter, in the dilute form of a drachm to six or eight ounces of water, makes a very good mouth-wash in those cases of ulceration, and will frequently stimulate indolent or foul-looking sores of the mouth or throat. When necrosis of the skin occurs, and there is abundant suppuration, the best method of treatment is by the application of mercurial ointment spread upon kid or cloth and applied directly to the part, care being taken, of course, to keep the wound thoroughly clean by frequent syringing with carbolated or weak bichloride solutions.

Two very important questions in these cases are, How soon should treatment be instituted? and, How long should it be continued? To the first of these the answer is, that treatment should be begun as soon as the symptoms have made their appearance. In a child who, although born of syphilitic parents yet shows no symptoms of the disease, treatment should not be instituted immediately after birth. It is better to wait till some symptoms make their appearance, for two reasons: first, to judge of the severity of the disease; and, second, to prevent the delay of symptoms by the premature use of mercurials. But as soon, however, as any symptoms have made their appearance, treatment should be instituted at once, and should be continued until all manifestations of the disease have passed away.

This, of course, applies only to those cases where the symptoms of inherited disease are mild at the outset.

When the child is born with manifestations of the disease, and especially if they are of a severe type, prompt and vigorous treatment should be at once instituted; but, generally speaking, in these cases the child succumbs to the severity of the attack before any method of treatment will be of much avail.

In the later inherited stage the treatment should be commenced as soon as any symptoms occur, and should be continued until their entire disappearance. It should then be intermitted, and the child placed upon tonics and carefully watched for several years, in order to see if subsequent symptoms recur; and upon their recurrence treatment should be again renewed and vigorously carried on as long as any symptoms remain.

This intermittent method of treatment is preferable to a continued one of several years, as it prevents the child from becoming accustomed to the remedies, and it also gives the surgeon an opportunity of judging whether the case is likely to progress to recovery, or whether the treatment is merely palliative.

In some cases, in the more advanced types of the disease, both mercury and iodide of potassium seem to lose their effect, and the patient, instead of improving under their administration, loses ground and becomes worse rather than better.

In these instances the treatment by mercury and iodide of potassium should be at once discontinued, and the patient placed upon tonics and restoratives, and everything done to build up the general health. But in these cases little can be done, as they are nearly always attacked with amyloid degeneration of the internal organs, inducing deep-seated cachexia, and nearly always leading to a fatal result—not, perhaps, directly due to the disease, but indirectly from marasmus.

Preventive Treatment.—It is oftentimes important, in addition to the methods of treatment which have been already detailed, to prevent symptoms from extending from the child to those about it, such as to the nurse or to its own relations. Notwithstanding the fact that for many years the contagiousness of some of the symptoms of inherited infantile syphilis was doubted, it is pretty clearly proved at the present day that syphilis may be conveyed from the infant to others by the secretion of its mucous patches, and care should be taken to limit, as far as possible, all sources of danger in this direction. The surgeon should be careful to impress upon the minds of those having the care of the child that absolute cleanliness is an important point in the question of treatment, and that no person should be allowed to kiss the child, nor should the child in any way convey the secretions from its mucous patches to sound and healthy persons. For that reason the napkins used by the infant should be put at once into water containing a solution of bichloride of mercury, and should be washed separately from the rest of the family linen. The child's person should also be kept scrupulously clean by repeated changing of the dressing in cases of ulceration; and everything connected with the local treatment of the child should be reserved entirely for its own use, and should never be employed by the other members of the family.

Should the child be fortunate enough to recover from its symptoms, it should be carefully and constantly watched to see that no fresh symptoms supervene, and the moment they occur they should be at once treated with the same care as at first. If these rules are rigidly adhered to and carefully carried out, symptoms which might be of importance, not only as regards the child but also those about it, may be checked at the outset, and perhaps limited in their course and duration.

Feeding.—In cases of syphilitic children it is often an important question to decide as to the best method of feeding them. Without doubt, the infant's best food is human milk, but in many cases the mother is unable to suckle her child, and the point to be determined is, whether an artificial method of nursing should be adopted, or whether the child should be transferred at once to a wet-nurse. If this latter plan can be adopted, it is, of course, much the better one; but no wet-nurse should be employed without having the danger of the infection fairly laid before her, and the risks which she runs in assuming the care of such a child. In the majority of cases no sound woman would be willing to run the risk, and it then becomes a question as to the best method for artificially bringing up the child. If it be decided to feed the child by the bottle, the composition of the milk used should be brought as near to that of human milk as possible. It should be used fresh every time, carefully warmed, diluted, and sweetened, and the child should be fed at regular intervals, both during the day and night, in order to secure a sufficient amount of nutriment. The best that can be said for it in these cases is that it is a poor substitute for the natural nutriment of the child, and that in nine cases out of ten it proves of very little service.

DIAGNOSIS AND PROGNOSIS OF SYPHILIS.

By HERMANN G. KLOTZ, M. D.

Importance of Diagnosis.—In the study of a disease as interesting in all its aspects as syphilis, as fascinating by the variety of its manifestations, and as exasperating by its constant surprises and insidious attacks, as alluring by the glittering appearance of therapeutic results, and as repulsive by some of its forms and by its associations, the physician is liable to overlook one point—the importance of the disease for the patient himself, its humane side, so to speak. Still, there is hardly any other disease which may have such influence upon the entire life of a person, upon business, social, and family relations. In deciding that a person has become infected with syphilis one may feel, if fully conscious of this importance, a solemn responsibility, like a judge pronouncing sentence on a convicted person.

It is true, sex, age, education, refinement of habits, and moral cultivation will greatly affect the impressions on the patient's mind. The one may only give expression to his regret at seeing himself for some time prevented from continuing his dissipations; while another will deplore the loss of the happiness of his life, the bright aspect of which he sees marred by an indelible stain. Ignorance will prevent the one from realizing his position, and moral depravity the other from accepting its responsibilities.

Unfortunately, the large majority of people possess a very vague and obscure knowledge of syphilis, often received from books or pamphlets, which are disseminated by quacks, and other people from improper motives. No wonder, therefore, that many have a greatly exaggerated conception of the malignity of syphilis and of the severity of its effects; extreme and rare consequences, like the eating away of the nose, entire loss of the hair, defacing ulcers, and other disfiguring lesions being accepted as of regular or common occurrence, and almost surely to be expected in every instance. As to contagiousness, the same extreme views will be met with. Wrong ideas are fostered only by the silence on the question, which naturally is observed by the large majority of those who have had personal experience, and by the secrecy with which everybody interested tries to surround his own suffering.

But even cleared of such undeserved aspersions and taken on its own real merits, it can not be denied that syphilis is always an unwelcome companion for the enjoyment of life and an irksome addition to its burdens. This is largely due to the character of the disease itself. Although, as we shall see further on in considering the prognosis, it is not really so dangerous to general health and life as is often supposed, it can not be denied that it may involve considerable pain and suffering, annoyance, expenditure of money, neglect of business interests, loss of time, etc., not to mention the unpleasant experience incidental to treatment, such as bad effects on the stomach and digestive organs from internal medicines, pain from injections, eczema and uncleanliness from inunctions, the detrimental effect of mercury on gums and teeth, etc.

But the chronicity, and even more so the uncertainty, of its duration, are the most embarrassing and most depressing features. Although due to a great extent to our imperfect knowledge of the real nature of syphilis, this uncertainty is the curse of the disease, and will remain so until we shall possess some means to determine without any doubt the presence or absence in the system of the human body of the syphilitic virus—whatever that may be—and of its derivatives. With our present knowledge, an absolute guarantee that no symptoms will ever again occur can not conscientiously be given, and so the unfortunate patient lives on for years under the constant menace of his cruel persecutor, ready to attribute every little ailment to its influence, and constantly on the watch for its manifestations. Under such circumstances even the natural periods of freedom from symptoms or of latency in the course of the disease may become periods of anxiety and torture.

The fact that some of the manifestations of syphilis, like the temporary loss of hair, eruptions on the face and hands, can not be sufficiently well concealed, is another link in the chain of unfortunate circumstances. But in a much higher degree this must be said of the contagiousness of syphilis, which enforces so many precautions and restrictions upon the daily life of those who earnestly endeavor to protect others from the danger of infection. It is, however, the social aspect which renders syphilis so obnoxious, oppressive, and embarrassing. Society, low and high, does not acknowledge syphilis; even when innocently acquired, at best it can be ignored, its name must not be pronounced; but when, nevertheless, it dares force itself into recognition, it is repulsed with often hypocritical indignation and treated with contempt. The unfortunate victim of the disease is therefore almost forced from the start either to sever most of his social relations or to carefully conceal his affliction; precautions rendered necessary by the possibility of contagion, restriction in his mode of living, as drinking, smoking, etc., imposed by hygienic considerations, largely increase the difficulties, but nowhere so much as in family life. The relations of syphilis to marriage and married life are so well known that it will be sufficient at this place to mention them. Its relations to life insurance but rarely receive the consideration they deserve, although nowadays they largely enter into the private affairs of a great number of people. Most of the companies absolutely refuse insurance to those who are or have been affected with syphilis, others accept them under certain conditions. The diagnosis of syphilis, therefore, either deprives many persons partially or entirely of the benefits of life insurance in the interests of their families or their business associations, or forces them to conceal their affliction, risking to see their policies declared void in case of detection. Besides, to many policies the original declarations made on application are attached; and who would care to leave to his family the confession of having once had syphilis, if it can be avoided?

Enough has been said, I believe, to substantiate the fact that it is not an irrelevant matter for a person to be adjudicated a syphilitic. At the same time, every man or woman really affected with syphilis will be in a much better situation if the diagnosis is made with exact certainty and at the earliest possible time, than if it is not made at all or is left in doubt. In the former case the opportunity is at once given to apply proper treatment and continue the same for a sufficiently long time, and thus avert as far as possible the evil consequences of the infection. Not so in the latter case. Then treatment will either be entirely omitted, or not be followed up with adequate energy and perseverance. In consequence thereof the disease will probably appear after the lapse of more or less time in a more aggravated and dangerous form, less amenable to treatment, and more likely to develop into incurable conditions. In the worst situation, however, those will be who have been declared to be syphilitics, and treated as such on a mere suspicion or without any positive and incontrovertible evidence. In my experience—and I feel confident that I do not stand alone in this opinion—*nonsyphilitic* syphilitics, so to speak, are the most deplorable and unfortunate people, and furnish the largest proportions of those hypochondriacs and syphilophobes, who live in constant fear of outbreaks of the disease, which never appear, everywhere suspect symptoms of syphilis on themselves, and, rushing from treatment to treatment, one more severe than the other, generally without medical advice, succeed in undermining their bodily and psychical health in a more thorough manner than syphilis itself could ever have accomplished.

Under these circumstances I must avow that I can neither understand nor approve the position of those who advocate the early extirpation of suspicious venereal sores at a period where it is impossible to ascertain their real nature. It can not be denied that among the published lists of such cases a large number deserve to be considered as at least extremely doubtful. The same I venture to say in regard to those who, mostly on the strength of theoretical reasoning, founded upon the bacillary origin of syphilis (which, while certainly highly probable, is not yet considered by the majority of syphilologists sufficiently established by facts), advise that general specific treatment be commenced as early as possible, in opposition to those who, more on the strength of actual experience, prefer, as a rule, to delay general treatment until the appearance of secondary symptoms. Whoever knows how easily the characteristic features of a hard chancre are simulated by ulcers of non-infecting nature, will admit that it is impossible to avoid errors. As long as there exists a reasonable doubt it ought to stand in favor of the patient, and every opportunity ought to be given him to be cleared of suspicion before the case becomes, through the application of treatment —often irreparably—prejudiced. Even if the physician may feel morally convinced that he has to do with syphilis in a given case, the diagnosis of syphilis ought to be made only when symptoms are present which, according to generally acknowledged principles of pathology, are not observed in any other disease but syphilis, or when other causes or diseases, which may produce the same or similar conditions, can be excluded with absolute certainty. Then it will be possible to follow a rule which has been given by Dr. J. C. Le Hardy, of Savannah, Ga., in an address before the Georgia Medical Association in April, 1885 (Atlanta Medical and Surgical Journal, N. S., ii, 1885–'86), and which I most emphatically indorse: "The exact nature of the disease should be so firmly fixed in the mind of the attending physician that no after circumstance, not even the disappearance of all the symptoms in a case diagnosed as syphilis, should shake his conviction or cause him to relax his efforts during the whole period necessary for the cure of that disease." That exceptional cases occur which demand immediate treatment, even where there may be a doubt, is readily conceded; the seat of the lesions or the grave character of the symptoms may demand instantaneous relief, and delay may involve irreparable loss. This will be the case most frequently in iritis and other eye troubles, and in tertiary affections, particularly of internal organs.

Difficulties of Diagnosis.—While in a great many cases, probably in a large majority, the diagnosis may be simple and easy, certain circumstances may render it extremely difficult in others. In the first place, in making the diagnosis of syphilis we have to rely entirely on clinical facts, because microscopy and bacteriology, to which nowadays we are used to look for the decisive vote in diagnostic controversies, so far have not offered an absolutely sure test for syphilis, certainly not one to be applied during the lifetime of the patient. Efforts have not been wanting to supply decisive data, and many a time the hopes of the scientific world have been raised to high expectation of seeing this important want filled.

Now characteristic cells, now characteristic grouping and co-ordination of cells, now peculiar conditions of blood-vessels, were believed to truly have furnished the proof for syphilis; but after a short time the same phenomena were found to exist in other pathological tissues clearly not connected with syphilis. So, notwithstanding what may be claimed by some microscopists, under the present state of pathological histology the microscope has failed to reveal histological conditions which were not common to several or all specimens of that class of new formations which since Virchow are known as granulomata, and therefore not pathognomonic of syphilis. Nor can it be admitted that the numerous efforts which have been made since bacteriology has come into existence to clear up the nature of syphilis have been successful in establishing a bacteriological test. Even the discoveries of Lustgarten and others, which so far seem to have come nearest to fulfill the stringent scientific demands, have by no means been generally acknowledged as meeting with all the conditions necessary to establish for the bacilli relations to syphilis similar to those of the bacillus tuberculosus to tuberculosis.

The proof of the bacteriological origin of syphilis will be particularly difficult or perhaps impossible, because experiment on animals, which has furnished such important facts in the pathology of other diseases, like tuberculosis, can not be applied to syphilis, since so far no animal has shown any specific reaction on inoculation; even a few experiments on monkeys, made by several French authors, having failed to give satisfactory results. Experiments on men being out of the question, no exact scientific method is available for diagnosis but the negative result of auto-inoculation with the secretion of doubtful sores. Restricted, therefore, to the clinical symptoms, even here we meet with different obstacles. Peculiar to syphilis, and almost unique in pathology, is the occurrence, as a regular feature of the disease, of periods of latency, during which even the most minute examination will be unable to discover the slightest symptom revealing the presence of syphilitic infection, which again may become manifest in an active form within a very short time. Such periods exist soon after infection, but are observed with increasing frequency in later periods. This will happen in a larger proportion of syphilitic women than men; but even among the latter, I feel convinced, the temporary complete disappearance of symptoms occurs a good deal oftener than most text-books will admit. The initial lesion may heal without leaving the slightest mark, the swelling of the neighboring lymphatic glands, generally the inguinal groups, may develop in a very slight degree, and after a short treatment retain so little of the enlargement that it will be impossible to decide whether their volume can be considered pathological or not. Besides, the inguinal ganglia are not rarely found moderately enlarged in consequence of intense muscular exertions incidental to heavy labor or to indulgence in athletic sports. Or these glands may be entirely absent, having been previously removed by operation, as I have observed in a few instances. The general enlargement of the different regular groups of lymphatic glands (cervical, axillary, epitrochlear, submaxillary, and popliteal) is not found so constantly as is often described, but rather forms a distinct symptom of the later stages of syphilis, while the indolent swelling of one or several of the above-named groups is indeed of frequent occurrence even in well-treated cases.

Other difficulties in diagnosis are presented by the fact that syphilis may affect every tissue and every organ of the human body. The examination, therefore, of every part of the body is demanded of the physician, and at least a certain knowledge of every branch of pathology, to be able to recognize syphilis in all its features. And, not content with extending its influence over the entire human organism, syphilis is not restricted to a single form of symptoms, but is manifest in the production of a great variety of lesions, nowhere so conspicuously as on the skin. But its true character of the Mephisto among the diseases, syphilis manifests in the tendency to appear in forms which closely resemble or almost simulate the types of others more common or perhaps less obnoxious diseases. In a lecture entitled Syphilis as an Imitator (British Medical Journal, April 5 and 12, 1879) Hutchinson has considered at length this remarkable fact, which is attested by a number of names, like syphilitic lichen, syphilitic psoriasis, syphilitic lupus, which have been long in use, and, although condemned as unscientific and misleading, present themselves again and again in spite of all efforts to suppress them. It is true that on close examination the syphilitic product, as a rule, presents some peculiarities which allow of the recognition of the well-concealed facies, but often it will require a sharp and well-practiced eye to look through the disguise. In the initial lesion the shape of innocent lesions like herpes, eczema, etc., may be assumed. Secondary symptoms also furnish frequent instances, but the most numerous and most deceptive examples are found among the so-called tertiary affections of acquired and especially of hereditary syphilis. Those of the central nervous and of other internal organs particularly appear in so close imitation of diseases free from any specific taint, that in some instances the dividing line becomes completely obliterated. The older syphilis grows the more it loses its specific character, and, as Ricord has said, the more honorable a face it assumes.

It must further be kept in mind that infection with syphilis does not afford immunity from any other disease, but that it may associate itself with all other acute and chronic diseases and thereby give rise to the most complicated conditions. Patients and physicians are often inclined to overlook this fact, and with the diagnosis of syphilis attribute every symptom that may appear to syphilis, and attempt to treat it as such.

A word may finally be said here in regard to the value of the history which is given by patients. It has been said that all syphilitics are liars and can not be trusted. In many cases this holds good, but quite often, particularly in females, the denial of all knowledge of primary and even secondary symptoms is undoubtedly sincere and honest, not to consider the numerous cases of those who have acquired their syphilis innocently or have inherited it. I have often been surprised how incompletely and inaccurately patients remember the symptoms they have had, how they deny some affections, how their memory fails or errs in relation to the time of certain affections or even of the primary sore, how the order of symptoms is confused, etc., and that in cases where the patient is fully aware that I have the notes of his case before me and that there is not the slightest reason for any deceit. On the other hand, some syphilitic patients are only too ready and willing to attribute to syphilis all and every ailment they become subject to, and on examination report all throat affections, rheumatic troubles, and particularly all forms of skin eruptions, however innocent, as sequelæ of their infection, the acne caused by the iodide of potash playing a very important part among these imaginary symptoms. All these circumstances are apt to greatly reduce the value of the history on which the diagnosis almost always has to rely to a certain extent.

Means and Rules of Diagnosis.—The question of the diagnosis of syphilis will confront the physician under different circumstances. First, a patient simply presents himself on account of some lesion or ailment in order to obtain treatment and relief, without having any knowledge or suspicion of its nature. Or, the patient seeks the physician with the direct and principal purpose to ascertain whether he has syphilis or not, or whether the symptoms which he has noticed on himself are due to syphilis or to some other cause. The characteristic features of the various manifestations of syphilis, as well as their differentiation from similar symptoms resulting from other diseases, have been amply treated in the chapters on symptomatology; here, only the general principles will be studied on which the proof of syphilitic infection has to be established.

It has been stated that the diagnosis ought to be founded either on the presence of such symptoms as are exclusively the product of syphilitic infection, or on the exclusion of diseases or causes other than syphilis, if the symptoms may be produced by such other causes as well as by syphilis. It is almost superfluous to mention that under all circumstances a careful and complete examination of the patient should be made, not only of that part or portion of the body which the patient himself offers for inspection but of the entire body. Where circumstances permit, the rule often given as absolutely necessary, to have the patient stripped entirely, may well be followed; reasons of policy or discretion, particularly where it is desirable not to arouse suspicions or apprehensions at once, may even in cases of male individuals render it more advisable to expose one portion of the body after the other. In the case of females this ought always be the method of examination, even in hospitals and other public institutions. Syphilis is so common a disease that the physician has constantly to be on the alert to detect its traces, not alone if the seat of the symptoms on the genital organs or the character of the bearer suggests the probability or possibility of a venereal infection. While syphilis is chiefly conveyed by sexual intercourse, the fact must not be lost sight of that its distribution has assumed such dimensions in all civilized countries that it has become more or less a common disease, and quite frequently is transferred by other means than sexual contact with the innocent as well as on those who court contagion by their associations. There are a number of pathological conditions so characteristic that they point in the most direct manner to syphilitic infection as their exclusive origin, so that in their presence the diagnosis can be made almost at a glance. Among these really typical phenomena have to be enumerated certain forms of primary lesion, some of the skin eruptions, particularly the papular syphilides, as well as certain macular exanthemata, for which the location is generally of great importance. Moist papules or condylomata lata of the genital and anal sphere, symmetrical ulcers of the tonsils with gray, lardaceous surface, mucous patches of the oral cavity, gummatous iritis, papules of the palms, gummatous ulcers of the pharynx, and among the later manifestations on the general integument rupia forms and the serpiginous tubercular and ulcerating syphilides are equally distinctly specific manifestations, which under no circumstances leave any doubt of syphilis.

Besides these absolutely convincing symptoms, there are others which, although strongly suspicious, are not alone sufficient to establish the proof of the presence of syphilis. Such symptoms are, for instance, mild angina with or without enlargement and sensitiveness of the submaxillary lymphatic ganglia, erosions and ulcers of the tongue, more or less extensive loss of hair in patches, simple iritis, painful nodes of the superficial bones, perforations of the nasal septum, nodes of the skin and of the subcutaneous tissue, indolent swelling of the testicle and its adnexa. Often enough the patient presents several symptoms of such character, or even a single one. Suspicion being awakened, it now becomes necessary to carefully look for confirmation of their specific nature. It may be possible to find other actual phenomena which will support the opinion, or sometimes only remnants or permanent sequelæ of former affections, like scars, etc. The most important information may often be gained from the history of the beginning and the development of the present condition, and from its relations to other symptoms which may coexist or may have been present at a former time.

It is of the greatest importance for diagnosis that syphilis usually follows a certain course through several more or less well-defined stages; within these periods certain symptoms follow others at regular intervals, or appear contemporaneously with other symptoms belonging to the same stage. This regularity has led to the classification of the different manifestations as primary, secondary, and tertiary symptoms. While it is true that these periods or stages, particularly the second and third, frequently overlap, that the third may anticipate the second, or that secondary symptoms may appear at a long interval after tertiary ones, these laws and rules are sufficiently consistent to often enable one to assign without difficulty particular symptoms to their proper place in the gradual development of syphilis. The fact that a certain symptom is observed within a certain time after exposure to infection when, according to common experience, just such a condition was to be expected, materially increases its value for diagnosis. If it is known, for instance, that a patient has first noticed at a certain date a sore of suspicious character, which has disappeared or has been removed by excision, and six to eight weeks after the appearance a number of small red spots or a limited number of small, slightly squamous papules are observed on his trunk, this insignificant eruption, which in itself would have to be considered doubtful, now assumes the character of positive proof of syphilis, provided it can be ascertained that no drugs liable to produce similar eruptions have been administered, or that the patient is not subject to psoriasis. In a similar manner the simultaneous presence of certain symptoms may reveal their specific nature. For instance, a macular eruption disseminated over the chest and trunk, even if not of a very decided character, when found together with a reddened, slightly swollen throat, moderate swelling of one or more cervical glands, and perhaps a certain amount of alopecia, furnish an *ensemble* of symptoms which justifies the diagnosis of syphilis. Sometimes the condition of an eruption when first observed may not be sufficiently characteristic for a diagnosis, but if left to itself and watched for a certain time its further development and changes, regularly met with in syphilis, but not in similar lesions derived from other causes, may decide the question in the most positive manner. In other cases it may be necessary, particularly in the presence of symptoms belonging to the more advanced stages of the disease, to rely on the prompt efforts of specific treatment in order to decide in favor of their syphilitic nature.

Great care, however, should be exercised in the employment of treatment as a test, particularly with iodide of potassium, because several other diseases are as readily affected by it as syphilis, particularly affections of the lymphatic apparatus, of the testicle and epididymis, swellings of the bones and joints, etc. Unless delay involves danger to some important organ, even in tertiary affections, preference should be given to mercury as the remedy for a test, as it must be considered more a specific drug for syphilis than iodine. On the other hand, it must be remembered that the effects of treatment may greatly interfere with the development of syphilitic lesions into their full pathognomonic maturity; that during continued treatment the degree of infiltration of the cutis in a papillary syphilide may hardly exceed the condition of a secondary roseola, thus apparently reversing the regular succession of symptoms and provoking errors of judgment.

As in all such cases the physician has to rely to a certain extent on the history of the case, and mostly on the reports of the patients themselves, it becomes painfully obvious how deplorable the unreliability of such means of evidence really becomes.

(*a*) **Primary Stage.**—The only symptoms of the primary stage are the initial lesion, the chancre, and the indolent swelling of those groups of lymphatic ganglia with which the lymph-vessels emanating from its seat directly communicate. The primary lesion may appear in various shapes, but its most characteristic feature is always the induration, that peculiar infiltration of the base or of the entire circumference of the lesion. It may assume considerable dimensions, and then it gives to the touch the same sensation as a lump of soft rubber; where it is only moderately developed it causes a peculiar stiffness, as if a piece of parchment was imbedded in the base of the sore. Although very rarely, induration may be entirely absent, and the primary sore may never exceed the condition of a very innocent-looking erosion, particularly on the external sexual organs of the female. The second symptom, the swelling of the neighboring glands, is equally constant, but has been found to be occasionally absent.

As soon as a more or less distinct induration begins to develop in a primary lesion the diagnosis becomes possible. Where it can be ascertained that the first appearance of the lesion was noticed a certain time after exposure to contagion, or where the source of infection by confrontation or by reliable information (not rarely obtained in cases of married women infected by their husbands) is known to be syphilitic, even a very slight degree of induration, felt only by the most subtle lateral compression, may permit a diagnosis with almost absolute certainty, the swelling of the lymphatic glands will soon confirm it. In such cases the diagnosis can be quite obvious, but it becomes more complicated, and not rarely impossible, if several lesions of similar or different appearance are met with on the genitals, which may have appeared immediately or only a few days after the probable infection, or where it is impossible to fix the date of the latter, or where the lesions have been cauterized either by a physician or by the patient himself, the use of the stick of the nitrate of silver being particularly liable to render the real condition obscure. A simple herpes or a slight abrasion may be present, which either heals at first only to break out again after the period of incubation has passed, or may not run the usual mild course, but after the proper time assume a more characteristic and finally a typical appearance. In other cases only the indolent swelling of the glands, or even the development of secondary symptoms, may decide the question. The indolent bubo may sometimes be deprived of its diagnostic value by acute inflammation or by suppuration—not so rare a complication, but not a symptom of syphilis itself. Under such circumstances the physician may have held his diagnosis in abeyance often for four or five weeks or longer. It may occasionally be judicious to give some indifferent or tonic medicine (but not iodine) to satisfy the patient's urgent solicitations; it happens, however, that such internal treatment afterward plays a figure in the patient's history and deceives other physicians under whose care he may come. In the face of some statistics, particularly in regard to the relations of syphilis and tabes dorsalis, it seems probable that such cases would be admitted as undoubtedly syphilitic on the strength of the patient's statement that he had general treatment after a sore on the genitals.

There are several conditions which may resemble the primary lesion with its typical induration: chancroids and simple abrasions on the privates, which have been cauterized, may show an inflammatory hardness of their base or of their surroundings; on certain localities, as on the frenulum, insignificant tears or abrasions may become hard, owing to frequent traction; œdema of the prepuce, particularly in paraphimosis, may assume a hardness which greatly resembles specific induration. Fistulous ulcers resulting from abscesses of Bartholini's glands in the female, or, in the male, suppuration of the glandular adnexa in the folds of the frenulum or glandular abscesses in the sulcus coronarius, occurring in connection with gonorrhœal urethritis, not rarely show borders of almost cartilaginous consistence. Primary lesions of the lips of the meatus urinarius, or of the fossa navicularis, may easily be mistaken for inflammatory swelling incidental to gonorrhœa. In all such cases a more or less intense acute swelling of the inguinal glands may be present and may increase the difficulties of diagnosis, the more as the syphilitic bubo sometimes shows a certain amount of sensitiveness on pressure or even of spontaneous pain. Sometimes the primary lesion or lesions on the genitals of females may appear in the shape of papules closely resembling those usually met with as secondary lesions on the same localities; *vice versa*, a solitary or a small number of secondary papules may be mistaken for primary sores. Here the condition of the lymphatic ganglia may fail to afford any information, while often the history decides the diagnosis.

Other sources of deception are chancroids or other ulcers, and erosions on the genitals of patients who, after having acquired syphilis at some previous time, expose themselves to new infections. In such cases the sores may exhibit a certain amount of induration of the base and borders which can hardly be distinguished from primary sores. Tarnowsky has shown that such pseudo-chancres can be provoked or artificially produced by mechanical or chemical irritation of abrasions or small wounds in syphilitics. Undoubtedly such lesions have occasionally been mistaken for primary chancres, and have furnished some reputed cases of syphilitic reinfection. The same can be maintained of ulcers which result from the breaking down of circumscribed gummatous infiltrations of the prepuce, the glands, and other portions of the penis, which are of much more frequent occurrence than is generally acknowledged. The absence of swelling of the inguinal glands will be of great weight for diagnosis in such cases as well as the more rapid and more complete breaking down of the nodules compared with ulcerated chancres.

Altogether the primary lesions of the genitals are not so likely to be overlooked, because on account of their seat they will readily invite suspicion of venereal infection. Not so with chancres of extragenital location, which usually afford much wider opportunities for the infection, directly or indirectly, of the innocent. The early recognition of chancres on the lips, tongue, tonsils, bearded face, nipples, and particularly of the fingers, is therefore of the utmost importance. Unfortunately, they often escape recognition, particularly because the separation of infection and appearance of the sore by the period of incubation fails to arouse suspicion and increases the difficulty of connecting the chancre with its source. In regard to syphilitic infection of the oral cavity, it does not seem unnecessary to mention that Kaposi (Moritz Kohn, Syphilis der Schleimhaut der Mundhöhle, etc., Erlangen, 1856) has claimed that almost exclusively in children, and not rarely in adults, the primary lesion in the oral cavity, on the lips, tongue, etc., appears in the shape of papules, excoriations, rhagades, superficial ulcers, etc., of the same character as they are usually observed in the secondary stage of general syphilitic infection.

In extra-genital infection it is not uncommon that the swelling of certain groups of lymphatic ganglia is the first and only symptom observed by the patient and presented to the physician, and that this swelling leads to the detection of the primary lesion. It is obvious, therefore, that they deserve the closest attention and the most minute examination of those localities to which the glands point as the probable seat of the lesion.

It remains to mention that on the genital organs, as well as on other localities, principally on the mucous membranes, the primary lesion of syphilis may bear close resemblance to tuberculosis and to epithelioma, and that through mistakes unnecessary operations have often been performed. The lymphatic ganglia may be enlarged in all such cases, and consequently are devoid of diagnostic significance. The mode and duration of development, but often only microscopical examination, will furnish decisive points for diagnosis.

(*b*) **Secondary Stage.**—The character of the secondary stage of syphilis is essentially that of a general infectious disease, which, like the acute exanthemata, takes possession of the entire organism and manifests itself at first by a number of more or less widely and symmetrically distributed phenomena, principally on the skin and on the mucous membranes of the throat and mouth. Unlike those diseases, however, it does not exhaust its power with the first outbreak, but has a tendency to recur from time to time, usually in more aggravated forms, still of general distribution, but accompanied by pathological conditions in almost all other organs of the body. Its symptoms generally succeed each other with a certain regularity, run a limited course, and in most instances leave the affected organs unimpaired in their functions and structure. If syphilis deviates from this regular course it has a tendency rather to advance than to take a step backward; it is more common to meet with precocious tertiary symptoms in the earlier period than to find the secondary stage prolonged indefinitely or into the tertiary. The secondary stage therefore presents a large number and a great variety of symptoms which on one hand add to the difficulties, and on the other offer greater facilities for diagnosis by the formation of combinations of several symptoms in different organs.

The early period which inaugurates general infection usually presents the least difficulty, particularly where a primary lesion has been observed, and where after the usual period of incubation the appearance of secondary symptoms is expected. Prodromal symptoms, as slight fever, rheumatic pains, anæmic condition, and general *malaise*, may still more facilitate the immediate discovery of the disease. Prolonged incubation may again render the diagnosis doubtful, and may demand further observation and suspense. The appearance of one or more solitary papules or pustules of a character generally found in later periods, which have been described as preliminary localized syphilides, occasionally precedes the general eruption, and may prove embarrassing and mystifying for diagnosis. Where nothing is known of the primary lesion, and the prodromal symptoms, particularly fever, appear with great intensity, while the first lesions on the skin are observed outside of the usual localities—for instance, on the face, or around the throat, and in limited number—the symptoms may closely resemble those of measles, smallpox, scarlatina, or rubeola, and cause mistakes, which, however, by a few days' observation will be corrected. Recurrent eruptions of general syphilides are rarely accompanied by intense fever or other severe symptoms.

The affections of the skin or syphilides are by far the most important manifestations of the secondary stage; next to them follow those of the mucous membranes of the mouth and throat. It is to these two organs that we have to look for the means of diagnosis in most cases, and from which we are able to derive the most important testimony.

The early as well as the later syphilides, particularly those of more or less general distribution, bear certain characteristic features, which, as a rule, render their recognition and exact definition more or less easy. Their color and pigmentation, their polymorphism, their mode of grouping, prominently the formation of annular and circular lines, their symmetrical localization, their mode of development, the consistency and color of scales and crusts, the absence of itching, are the principal points of distinction, as have been fully described in preceding chapters, to which we must refer the reader for all the details of information. With all these distinctive peculiarities of the syphilides, however, it must be acknowledged that without some practical experience it is not always easy to recognize their specific character; and while the practiced eye may acquire a certain almost instinctive perception for the syphilitic taint, the diagnostician will often hesitate and confess the inability of a definite distinction without repeated observation.

Among the most characteristic skin lesions due to syphilis are the soft papules or condylomata lata of the anal region, the scrotum, the vulva, and the folds of the vulvar region, the dependent surface of the mammæ, the axillæ, etc. Solitary papules and pustules of the hairy scalp and the papular syphilide of the forehead, often called the corona syphilitica, are also of great value for diagnosis. But scaly papules or patches on the palms and soles, although a common product of syphilis, ought not to be considered as an absolute sign of syphilis, since eczema, psoriasis, and lichen ruber (pityriasis rubra pilaris) may occur on these localities. On the contrary, other skin lesions are particularly apt to cause errors of diagnosis; for instance, certain forms of pustular syphilides are difficult to distinguish from lesions of simple acne, as is indicated by the name of the "acneform" syphilide; lichen syphiliticus, the small papular syphilide in groups and patches, as the very name indicates, may closely resemble the disseminated form of lichen planus.

The precocious appearance of ulcerating and other aggravated forms of skin affections of the tertiary type is not likely to cause difficulties in the diagnosis of syphilis itself, but may rather lead to mistakes in regard to the duration of the disease and to the time elapsed since infection.

Among the nonspecific skin diseases particular attention must be called to erythema multiforme, which appears in syphilitic patients either as a complication from causes which are equally active in its production in nonsyphilitic individuals, or from certain influences of the syphilitic virus on the nerves, or as a drug exanthem in consequence of the drugs employed in the treatment of syphilis, particularly of mercury. It may be easily mistaken for a syphilide, the more so as it sometimes assumes a darker, more bluish tint under the influence of syphilis. While it may often be very difficult to distinguish the syphilides from the other skin diseases if they appear alone, the physician's diagnostic skill will be taxed much more severely if eczema, acne, psoriasis, scabies, and other skin diseases are simultaneously present on the patient, whether syphilis has appeared on a patient previously or habitually affected with these common diseases, or that the latter have been added as complications to the preexisting syphilis.

Next to the external integument the mucous membrane of the oral and pharyngeal cavities becomes the most frequent seat of syphilitic manifestations of the secondary stage, the soft palate, the tonsils, the tongue, and the lips being favorite spots for their localization. Some of them present conditions not less characteristic than those of the skin. Others may resemble simple catarrhal affections, tonsillitis, diphtheria, etc., particularly during the early stages, when fever, acute swelling of the submaxillary glands, and general symptoms may largely increase the difficulties; tuberculous lesions and other malignant ulcers and new growths will not so easily be confounded with early syphilitic lesions.

In most instances we shall not look in vain for pathognomonic symptoms on the skin or on the mucous membrane; still it may happen that neither the one nor the other is affected at all, or so slightly that they are entirely overlooked by the patient—the early syphilides being particularly likely to be neglected because, as a rule, they cause little inconvenience as long as they are not exposed to view under ordinary circumstances. Other symptoms, therefore, may be first present, or we may have to look for syphilitic manifestations elsewhere. The different groups of lymphatic ganglia distributed over the entire body furnish important testimony. In the majority of cases one at least of the different groups is found to be enlarged in the manner characteristic of syphilis, in others a participation of almost all the groups will be observed. Great stress has been laid by some authors on the enlargement of the cubital or epitrochlear gland; by others its pathognomonic significance has been questioned, and correctly so, I believe.

Other symptoms which are of not infrequent occurrence in the secondary stage are loss of hair, iritis, early periostitis or joint affections with more or less pain, particularly cephalalgia where the cranial bones are involved, affections of the nails, etc. Taken singly these symptoms may not be sufficient to determine the presence of syphilis. But if two or more are present, or if they are found in combination with suspicious even if not fully characteristic affections of the skin or of the mucous membranes, they will allow of a positive diagnosis. It is well to remember that among the affections of the internal organs of the human body those of the nervous centers are most frequently observed during comparatively early periods of syphilis. Mauriac, I believe, is right in maintaining that the later the affections of the nervous central organs make their appearance the less probable is their connection with syphilis. Visceral syphilis of the other important organs, including the testicle and its adnexa, are only exceptionally observed in the earlier stages.

It must be well understood that, in general, syphilis will develop its perfect types only as long as it is left alone, but as soon as treatment has begun to exert its influence the characteristic features become modified and in many instances only fragmentary. It is certainly rare at the present time to see a patient pass successively through all the stages of syphilis in regular order. The continued treatment with small doses of mercury is particularly likely to interfere with the course of the disease, and it is by no means exceptional to never again meet with any manifestations of syphilis after the first set of secondary symptoms has disappeared. Treatment inaugurated before the appearance of secondary symptoms seems even more liable to change the regularity in the course of the disease. From my own experience, I am inclined to the belief that it causes more fragmentary but nevertheless more aggravated and obstinately returning forms. It is true that irregularities and malignity may occur without any treatment at all, but not as frequently, I believe, as under the circumstances just mentioned.

It may happen that the physician finds it absolutely impossible to recognize the presence of syphilis, even at a comparatively early time after infection. In the absence of a reliable history it can not be recommended, under such circumstances, to subject the patient to any specific treatment, but it seems advisable rather to await the actual forthcoming of symptoms more or less absolutely indicative of syphilis. In other cases, where there are strong reasons for suspicion, and where the nature of the lesions precludes the effectiveness of specific treatment unless syphilis was really their cause, the therapeutic test may well be applied and prompt curative effects accepted as a criterion. For skin affections resembling psoriasis the results of treatment with iodide of potash would not be of diagnostic value, since excellent results from iodine in psoriasis vulgaris have been reported by several authors.

Treated or not treated, the older syphilis becomes the more difficult will be the diagnosis, because the symptoms will be less numerous, more fragmentary, and obscure. There are a number of other conditions which are always strongly suggestive of syphilis, as paralysis of the cerebral nerves, principally of those affecting the eye, persistent neuralgia, nocturnal headache, repeated abortions, which can lead to a certain diagnosis if other confirmatory evidence can be produced. Besides these more distinct and by no means unimportant symptoms, we often observe a number of trifling and obscure affections, which, while of no great consequence in themselves, are almost constantly teasing and harassing the patient: rather indefinite spots or papules on different parts of the body—now on the wrist, now on the neck, then again on the penis—not symmetrical, more often slight lesions on the tongue and on the lips. The latter are often due to smoking or other mechanical or chemical irritation, sometimes probably to mercurial treatment. In appearance they do not differ from similar lesions observed on persons absolutely free from any syphilitic taint, but subject to similar local irritation, who as a rule will not consider it necessary to consult a physician on their account. But the syphilitic will worry about them, and often can not be persuaded to believe that they have nothing to do with his syphilis. Mercurial treatment may occasionally be followed by their disappearance, or it may show no influence at all, or may even aggravate them. As a rule, they disappear under simple and mild local remedies, only to appear again and again in shorter or longer intervals, spontaneously or on provocation. I believe, however, that the diagnosis of syphilis ought not to be made on the presence of lesions of such character, nor ought they to be considered as actual recurrent outbreaks of syphilis even in a person known to be syphilitic. A similar position has to be taken in regard to recurrent attacks of herpes progenitalis, which are frequently observed on syphilitics, but can not be accepted as a symptom of syphilis.

(*c*) **Tertiary Stage.**—In the tertiary stage syphilis has lost its general character; its actions do not affect the general health any longer except indirectly, if important organs become the seat of the lesions. All regularity as to topography, chronology, recurrence, course, etc., is at an end; capriciously now this now that organ is selected for some manifestation, which may continue indefinitely, or heal either spontaneously or from treatment, but rarely without leaving some loss of substance or some irreparable functional impairment. The importance of the lesions is therefore practically a local one, depending on their seat, and as it is almost universally accepted that in the tertiary stage syphilis has lost its contagiousness, the diagnosis loses a good deal of its gravity for the patient, at least as far as his social and family relations are concerned. Nevertheless, the same principles ought to be adhered to in making the diagnosis which have been adopted for the other stages, only we shall more frequently find occasion to rely on the effect of antisyphilitic treatment.

The history of the patient, of precarious value under any circumstances, will disappoint even much oftener in tertiary syphilis than in the early stages. The considerations which induce patients to purposely deny or conceal their infection may prevail to the same extent, or even more, in after years, but often enough the denial may be made in good faith, either because the long time elapsed since the infection may have obliterated all remembrance of the facts, or because the early symptoms have not been observed or their nature not recognized. The rather well-established fact that cases with very mild early symptoms are more frequently followed by tertiary symptoms renders this supposition not so improbable. In women, particularly, experience has taught me almost to make it a rule, in the face of symptoms apparently of tertiary character, to question as little as possible; often, in the course of time, I have received valuable voluntary information which at first was obstinately withheld, while apparently unwelcome investigation has been met with a flat denial and subsequent disappearance of the patient. Syphilis acquired during childhood is naturally much more liable to leave the patients ignorant of their condition. Of course, where a distinct history is obtained it will help a great deal to make the diagnosis certain, and will lend decisive value to symptoms otherwise doubtful. Under any circumstances, a careful examination may confirm the diagnosis by the discovery of signs of former affections. In the first line, those localities which are the favorite seat of secondary and primary affections should be subjected to a scrutinizing exploration: the lymphatic ganglia for remnants of enlargement, the genitals for characteristic scars from primary sores, the entire skin for scars and pigmentation, the oral and pharyngeal cavities for scars, the eyes for changes in iris and cornea, the joints and superficial bones for thickened portions or irregularities of their surfaces. The anal region, the corners of the mouth, and the lips are most frequently the seat of characteristic scars, the lower extremities of peculiar pigmentation. Every scar on the legs should not be accepted as a proof of syphilis, since ulcers of undoubtedly mechanical origin may leave conditions exactly like those from unmistakably syphilitic ulcers.

The tertiary symptoms themselves are often just as typical and significant as those of the secondary stage, so that they will at once establish the diagnosis. All the organs which are accessible to visual or tactile examination furnish numerous examples of such manifestations. The skin and subcutaneous tissue, the nose, throat, and larynx, and their mucous membranes, the testicles, the superficial bones—particulary those of the cranium, the tibiæ, claviculæ, ribs, and sternum—present conditions entirely peculiar to tertiary syphilis. Several forms of skin affection have been mentioned before; the subcutaneous gumma and ulcers resulting from them, rupia, the tubercular serpiginous syphilide, present pictures not easily to be mistaken. In certain localities, however, particularly on the outside of the nose, the ulcerating gummatous process may establish conditions closely resembling lupus; the scarcity of tubercle bacilli in true tuberculous lupus will not always allow us to obtain the microscopical proof. The often disastrous effect of cauterizations and operations in such cases not only justifies a trial of specific treatment, but ought to make it almost imperative. The same may be said of the ulcerative processes of the soft and hard palate, the pharynx, and of the nasal cavity, particularly when perforation seems imminent. Here the effects of iodide of potassium or mercury, or of both combined, may serve to the exclusion of tuberculous and carcinomatous affections, although often enough the syphilitic character will be just as conspicuous as in cutaneous affections. The importance of gummatous ulcers on the genitals has been duly considered already. Both on the skin and on the mucous membranes the condition of the scars formed by tertiary lesions will often be of the greatest value for diagnosis, the radiate form prevailing on the latter, while on the former the sharp-edged, round or kidney-shaped scar is common.

The tongue is a favorite seat of tertiary lesions, and probably nowhere else will the differentiation of syphilitic ulcers and papillary growths from tuberculosis, and principally from epithelioma, be so difficult, while real gummata are more readily recognized. The influence of irritating agents, particularly of tobacco, must be taken into consideration in affections of the tongue.

Syphilitic new growths of the testicles and epididymis—the latter of rare occurrence compared with gonorrhœal swellings—while easily discovered, are not always distinguishable from other new growths, although their great consistency, the absence of pain and sensitiveness, will render their specific nature very probable, more against tuberculosis than against sarcoma and carcinoma. Among the lesions of the superficial bones, if not complicated with ulcerations, periostitis, and osteitis, do not differ much from traumatic and other nonspecific forms; the spontaneous pain, mostly exacerbating at night, is more characteristic of syphilis, but the peculiar consistency of the true gummatous swelling will offer less difficulty of recognition.

While it is true in most instances that the products of tertiary syphilis show a more rapid development than other new growths like epithelioma, sarcoma, and tuberculosis (lupus), and have a greater tendency to break down and to ulcerate, occasionally the newly formed granulation tissue becomes transformed into substantial and almost sclerotic connective tissue of great durability, not only on the bones, where periostitis ossificans is by no means rare in syphilis, but also on the external integument. Such formations have become the object of operations in consequence of a wrong diagnosis, as shown by the experience of some of the most eminent surgeons.

As another manifestation of tertiary syphilis, which only within the last few years has attracted the attention of several authors, and which may become of importance for diagnosis and treatment, we here must mention certain alterations of the skin observed on the finger-tips which seem to be the result of a chronic arteritis or endarteritis of the peripheral blood-vessels due to syphilis: coldness, bluish color, circumscribed necrosis, and exfoliation of the epidermis or more deeply reaching gangrene—symptoms resembling those of symmetrical gangrene and Raynaud's disease.

For the diagnosis of visceral syphilis, the tertiary affections of the internal organs—liver, spleen, kidneys, lungs, heart, and particularly of the great nervous centers, spine, and brain—almost every positive sign is generally wanting; the symptoms do not essentially differ from similar affections resulting from other causes except by their fragmentary and incomplete nature, and circumstantial evidence is required to refer them to syphilis. This evidence may be furnished by the history of the patient and therefore be uncertain or untrustworthy. However, where it is positively known that a patient was infected with syphilis at a more or less remote period of his life, it has always to be considered as the possible cause even of common affections, and, where the usual causes can be excluded, has to be accepted as the etiological factor.

The most important evidence will be found in the discovery of scars, swollen lymphatic ganglia, intumescence of the tibia and other bones, certain conditions of the eye and other distinguishing residua of former manifestations, and they must be carefully looked for in all such cases. Sometimes, mostly in cases of nervous affections, the age of the patient will be of great consequence for the diagnosis. All efforts to find the connecting link between a visceral affection and syphilis may often be in vain, and nothing will guide us in the diagnosis but the experience that such affections occur frequently in individuals known to be syphilitic or have actually been proved to have been produced by syphilis before. In such a situation quite often the test of antisyphilitic treatment will be the only means of confirmation of the diagnosis. Its application will be so much more justified, since often important organs are threatened with entire destruction or functional impairment. In many cases the good results of the therapeutic measures will support the diagnosis; a negative result does not always prove the absence of syphilis, for often the syphilitic process has accomplished its mischief in such a manner that its results are beyond the influence of treatment, while its further progress can be arrested.

The affections of the nervous centers are undoubtedly by far the most frequent and most important examples of visceral syphilis. Whether everything is really due to syphilis that modern neurology is attempting to lay at its feet, the future will decide. But in the face of this tendency to find syphilis at the bottom of almost all chronic brain and spine diseases, the imperative demand for a careful, conscientious diagnosis is doubly justified.

(*d*) **Hereditary Syphilis.**—The diagnosis of hereditary syphilis in early life, where its manifestations are most frequently observed, is, as a rule, comparatively easy. The history of the parents and of other children of the same family may furnish important testimony, the proof that one of the parents, or both, have been infected with syphilis before or at the time of conception, or during the pregnancy of the mother, being the principal one; the knowledge of the fact that children previously born have had signs of syphilis being the next in importance. In the absence of such direct evidence, the repeated occurrence of miscarriages and great mortality of children in early life in the family previously to the birth of the child which forms the object of the inquiry, indirectly points strongly toward syphilis. The examination of the child, however, will result in the discovery of one or more characteristic symptoms. The affection of the nose, the rhagades of the lips and corners of the mouth, papular, pustular, and particularly bullous eruptions, their localization around the anus and the genitals and on the palms and soles, swelling of the testicle, and of the epiphyses of the bones of the extremities, and very often the poor nutrition and development, are the most conspicuous signs. In milder cases the children may be well nourished and in perfect health, exhibiting only one or a few of the above-named symptoms developed to a slight degree; occasionally only a few broad papules may be present in the anal region. All these manifestations may be expected to be present immediately after birth, or to appear within a few months, certainly within the first year. It is well, however, to remember that syphilis may be acquired very early in life; that in such cases infection almost invariably takes place in the mouth, or at least outside of the genitals; and that, according to Kaposi, the primary lesion may take the shape of a papule or other lesion closely resembling those of secondary eruptions, instead of the form of the typical primary lesion.

The diagnosis of hereditary syphilis is much more difficult in older children, at the time of puberty, and even in adult life, whether symptoms suggestive of syphilis then be present or not. The history of the family may on investigation prove to be of some value, great mortality of children in the family sometimes furnishing a clew; more often no data of importance can be gathered. The examination of the patient himself ought to be directed in the first line to all those portions of the body which have been enumerated above as the principal seats of the early manifestations of hereditary syphilis, in order to detect their traces. Where such symptoms have been present, delicate but entirely characteristic scars will almost invariably be found, particularly around the nose, mouth, and anus; the testicles may be found atrophied, or enlarged and abnormally hard. Particular attention is generally paid to that combination of symptoms known as the triad of Hutchinson—that is, the simultaneous existence of keratitis interstitialis, affection of the middle ear, and characteristic malformations of the front teeth of the second dentition, particularly central notches of the upper central incisors. The pathognomonic significance of this triad has been denied by some authors and accepted by others. In regard to the teeth, I am convinced that the importance of this symptom has been greatly overrated, and that almost every malformation or deficiency of the permanent teeth has been paraded as "Hutchinson's teeth," while in reality even the most essential form, the central notch of the upper incisors, can be observed on persons absolutely free from any syphilitic taint. Much more regular and important are the pathological conditions of the bones of the cranium, the face, and of the extremities, particularly of the tibiæ, for the detail of which we must refer to other chapters of this volume. As a rule, the whole appearance of those affected wlth hereditary syphilis bears the stamp of some irregularity of development; while the face has a rather senile expression, all the other portions of the body are corresponding to a much earlier period in life, making individuals of twenty resemble those of twelve or fifteen years, etc.

Besides these peculiar features, all those symptoms may be observed in hereditary syphilis which occur during the tertiary stage of acquired syphilis; as it seems that a much larger proportion of cases of hereditary syphilis than of acquired reaches the tertiary stage. There has been much debate on the question whether a *syphilis hereditaria tarda* really exists—that is, whether hereditary syphilis may develop its first manifestations a number of years—eight, ten, twelve years, and longer—after birth. It has been claimed that the apparent absence of the early symptoms must always be due to oversight or want of observation. I have never been able to understand the importance attached to this point; if early symptoms must necessarily have preceded, they may just as well have played their part during intra-uterine life, as numerous prematurely fœtuses clearly demonstrate. With this explanation the late hereditary syphilis is entirely divested of its extraordinary features.

Ethics of Diagnosis.—The diagnosis of syphilis once made in a given case, the end of the difficulties is by no means always reached. Important questions will arise, which have less to do with the professional education and the scientific attainments of the physician than with his tact and personal character, with those qualities of the man and gentleman, the possession of which, combined with knowledge of human life and of human nature, alone enable the physician to obtain and retain an honorable and dignified position in professional as well as in civil life. From what has been said in the early pages of this chapter on the importance of syphilis for the patient's life, it is easily understood that syphilis, probably more frequently than other diseases, will produce situations of embarrassing nature. This applies in a limited way only to public service in hospitals and dispensaries, but rather to private practice. No exact rules and regulations can be given in such matters, where in every single instance outward circumstances have to be considered for the guidance of the judgment of the physician. Some general suggestions, however, and the indication of the principal points in the conflict of interests, do not seem to be uncalled for at this place.

The first question which will present itself is, Shall the patient be informed that he or she has syphilis? Many important reasons strongly demand an affirmative answer, most urgently so, at least in reference to the early stages, the contagiousness of the disease. Its serious character, the demands of methodical and continued treatment, the necessity of changes in the mode of life, the giving up of certain habits, like excessive smoking, drinking, etc., which require the active and intelligent co-operation of the patient, all point to the advisability of disclosing the nature of the disease at once and without restraint. As it is of the utmost importance in the case of syphilis to gain the fullest confidence of the patient in order to guide him safely through the long course of the disease, he certainly ought to be met with sincerity and truthfulness from the start: the discovery of one act of deceit, even if undertaken with the best of intentions, may shake or destroy forever absolute reliance on the physician's word. Still, there are weighty considerations which will not only permit but rather make it a duty to conceal the truth temporarily or permanently. The character and nervous disposition of the patients themselves, aside from external circumstances, may furnish sufficient reason to withhold the knowledge of their infection until in some way they can be prepared for the painful news. Many have such a fear and horror of syphilis, founded either on reliable information about its character, or much oftener on vague and exaggerated impressions and reports, that to find themselves suddenly brought within the power of the dreaded enemy may entirely unnerve them and fill them with despair. In other cases, outward circumstances, in the first line family relations, may add remorse and fear of disastrous consequences, so as to make the apprehension of some rash act by no means so unfounded. Although I have no personal knowledge that the discovery of syphilitic infection has really led any one to commit suicide, I certainly do not consider it among the impossibilities. Therefore I believe that the greatest care should be exercised to ascertain the patient's disposition and his possible prejudices before telling him the truth or the whole truth at once. Under favorable circumstances the hint of a possibility of the infection may be given, and by gradually allaying the extreme fear and correcting the exaggerated ideas the final information may not prove such a shock.

Where the unfortunate victim is alone concerned in its consequences and is responsible to no one else, the duties of the physician will not bring him so much in conflict with his conscience; but much more embarrassing and complicated situations arise when the family relations of the patients increase the responsibilities of the infection—when in married people the infection of the one points to the other as its cause, or to a direct violation of sacred duties.

How are we to decide sometimes who is the culpable party, or whether the infecting party is not really innocent of any indiscretion, infection having taken place by accident and not by illicit intercourse? Observations of extra-genital chancres and the infection of innocents become more frequent with every year, and they often play mischief in families and give occasion for unjust insinuations and suspicions. Strange to say, it has been my experience that physicians who loudly preach the dangers of syphilitic infection by the use of pipes, cigars, drinking-vessels, etc., as something common, in practice will just as loudly denounce the patient as a liar and as an impostor who proclaims his innocence and claims accidental infection under by no means impossible or improbable circumstances. But even if we know who really is to blame, we often will be justified in concealing the true nature of the disease and its cause; not to shield the guilty parties, but to avoid bringing more misery and suffering upon the innocent ones by destroying their confidence in their partners for life, however undeservedly bestowed, and with it their own and often their families' happiness. Hereditary syphilis in children may here play a very important part.

In all such cases it is the danger of the infection of others which places so great a responsibility on the shoulders of the physician. Under any circumstances he must inform the patient of this danger, and give advice how infection may be prevented. This may be easy enough with unsuspecting persons, but may often require the greatest tact and skill. It is hardly necessary to mention that the same precautions have to be taken as soon as the slightest suspicion of syphilitic infection exists, and not to be relaxed until syphilis can be excluded with absolute certainty.

Another question arises if a third person seeks information from the physician about the syphilis of his patient. It is obvious that ordinarily he is bound to the strictest secrecy, and even to great caution in refusing information. But if employers inquire about servants or other employees, parents about their children, if the father of a daughter engaged to be married seeks the medical attendant of his future son-in-law, a flat denial of or an evasion of the truth does not seem to be within the limits of the professional duties of the physician. In the first case, I believe it absolutely becomes the duty of the family physician to inform the family of the dangers of an infection imminent from a syphilitic servant or employee; he ought, however, to inform the infected person of the necessity of such a proceeding, and give him a chance to avoid exposure by immediate voluntary retirement; but in the case of a wet nurse all considerations are to be set aside, and the facts to be communicated immediately to the head of the family. For other physicians but the family physician such a duty would not seem to exist, probably not even the right to divulge anything concerning the disease of his patient. But, by a denial of the truth he may allay the well-founded suspicions of the inquirer, cause him to relax necessary precautions, and thus assume a certain responsibility in case of later infection. Evasive answers or absolute refusal to answer any questions would almost equal an acknowledgment of the facts; hence the dilemma in which the physician finds himself, the best way out of which would probably be to direct the inquirer to the patient himself, and at the same time inform the latter that inquiry about him has been made, and by whom. This seems to be the proper way to act in all the cases of more or less near relationship mentioned above, coupled with the urgent advice to the infected person to anticipate inquiry by voluntary confession; between children of minor age and parents it might be appropriate to set aside the restrictions of secrecy. Among other situations of this kind, which easily could be multiplied, I may mention inquiries made by life-insurance companies. No information at all ought to be given in such cases except on the distinct request of the patient seeking insurance, made either in writing or verbally, if possible in the presence of a witness. If doubtful situations occur in judiciary cases, it ought to be submitted to the judge whether a question concerning a patient's syphilis must be answered or not.

A further point deserving some consideration is whether it is advisable to give to the patient, in whose case the diagnosis of syphilis has just been made, any intimation or even fuller information concerning the probable course and particularly the probable duration of the disease or treatment, be it in answer to his inquiry or voluntarily. With a sensible person it seems to me decidedly preferable to perhaps increase for the moment the mortification felt over his misfortune, than to bring on disappointment after disappointment when all the trouble would seem to be over, and renewed prolongation after recovery had seemed certain. Once prepared for a continuous and arduous campaign, the patient will be more willing to conform to the necessary restrictions and ordinations, and will find the time of trial passing faster than he expected. On the other hand, exaggerated imagination of the severity of his particular case, gradually distrust in either the capacity or the sincerity of his adviser, and finally entire loss of confidence in him will follow, and place the patient in a much worse condition. Those, however, who become deterred by the discouraging prospect of prolonged observation or treatment will not prove satisfactory or grateful patients either way, but will become neglectful of themselves, only to throw the blame of ill success on the physician.

A few words may be added, in conclusion, in regard to the moral side of the relations between the physician and the syphilitic patient. While I fully agree with those who say that the physician ought never to favor, encourage, or sanction immoral relations and illicit intercourse —that it it rather his duty to prevent them whenever he can do so—I can not acknowledge that the physician is constituted or ought to constitute himself a judge of his patient's morals. As soon as they have become infected with syphilis, even by their own indiscretion, and have been accepted as patients by the physician, they are entitled to the same consideration and to the same sympathy as those afflicted with other diseases. Syphilitic patients, who become disgusting and repulsive by their moral depravity and by their shameless manners, would hardly prove attractive without their syphilis; and nobody can blame a physician who refuses to treat them longer. But to consider a syphilitic, *eo ipso*, as an outcast, as an impious and wicked individual, is inhuman. If syphilis was dealt out in direct proportion to immorality and excesses, it would be different; but, in reality, the greatest sufferers from syphilis are by no means always the greatest sinners, and punishment often seems rather severe for the indiscretion or fault committed. Certainly no one will refuse his sympathy and pity to those who have innocently become infected with syphilis. Many of those who are themselves responsible for their misfortune are just as deserving of the physician's kindness and compassion, or even more so, since, owing to the necessity of keeping their sickness a secret from friends and relations, they may have nobody else but him to look to for a mite of the condolence and consolation so richly bestowed on those afflicted with other diseases—diseases which often are just as much as syphilis the consequences of reckless life and vice.

PROGNOSIS.

Syphilitic patients are great questioners. Not only do they understand how to shape their questions in such a way that they do not leave any loophole to escape a more or less direct answer, but they develop a wonderfully accurate memory in regard to the answers they receive from the physician, however easily and frequently it may fail them in relation to other matters concerning their syphilis. The large majority of such questions will probably be in reference to the prognosis of syphilis, which naturally is of the greatest interest to the patient. Can I ever be cured? How long will it take before I can consider myself well again? Shall I ever be able to marry? Can I ever have healthy children? and similar problems, will the physician be asked to solve, and in most instances to solve quickly, without too long deliberation, otherwise the only too easily suspicious patient will begin to distrust his sincerity. It is therefore well to be prepared to answer these questions as promptly, as exactly, and as definitely as possible, and for that reason it is necessary not only to become well acquainted with the opinions of those who have the greatest experience and the widest acquaintance with syphilis, but also to adopt or form an opinion of our own, at least on questions of general bearing. Our knowledge of syphilis is still so essentially empirical that it requires experience, and long experience, to collect sufficient facts to develop a strong and settled personal conviction on any matter connected with it, and particularly so on prognosis. But that does not forbid that our opinion may gradually be modified according to our own observations, only it must have a decided shape at any given moment in which to be presented to the patient, so that it may not appear in an uncertain light to him. Between the extreme views of those who can not paint the picture gloomy enough, and those who are almost willing to consider syphilis a blessing in disguise, certain fixed rules and principles can be agreed upon for the guidance of our decisions. In the prognosis of the single case so many factors enter into competition for its modification that much greater freedom must be left to the individual judgment of the physician. The importance of syphilis for the patient, which has been amply considered in the preceding chapter, places the physician under the obligation to act with the same conscientiousness and cautiousness in making the prognosis which has been demanded for the diagnosis.

Value of Statistics.—Our knowledge of syphilis being formed almost entirely on experience, it might be inferred that statistics would play an important part in the decision of the leading questions. But, unfortunately, it is almost impossible to produce reliable statistics either from private practice or from hospitals. In the first line the enormous frequency of the disease and its distribution among all classes of people defy accurate estimation of the number of those who actually come at any one time under its influence. The long period over which syphilis usually extends makes it impossible for the physician to follow it over its entire course, or, one might almost say, through the entire lifetime of all or even a majority of his patients. Many circumstances will prevent the syphilitic from returning to the same physician with every recurrence of his syphilis, or to go to the same hospital whenever he is in need of treatment. A large percentage of syphilitic manifestations pass unnoticed by the patient, or are overlooked or not recognized by physicians. The great variety of symptoms which do not reveal their immediate relations to the syphilitic infection, and the less typical character of many of the later manifestations, particularly of visceral syphilis, will largely contribute to the scattering of the patients among different observers. Statistics will therefore either embrace only a limited number of the cases that have come under the observation of one man or of one institution, or only a limited period out of the entire course of the syphilis.

Collective statistics, from which the best evidence would have to be expected, have been tried in several countries, but even they have failed in their results, partly on account of the enormous frequency of the disease, partly because the large number of mild cases soon withdraw from observation. Every patient who is fortunate enough to be able to conceal his infection will naturally take good care not to divulge his secret, thus leaving only less fortunate, more aggravated cases as the material for reports. Statistics furnished by life-insurance companies would be of great value, if we could feel sure that in every case the previous existence of syphilis is actually recorded, and has not escaped the knowledge of the insurers either from intentional concealment or from *bona fide* ignorance or lapse of memory. Public death records, from obvious reasons, in many instances will fail to indicate syphilis as the cause of death, even where its influence was a direct one, but still more so where it was responsible in a more indirect and secondary way. Statistics of hereditary syphilis based upon the records of public institutions, like foundling asylums, which, as a rule, receive their inmates from among those classes whose circumstances in life furnish the least favorable conditions for their offspring, can not be considered as fair or absolutely accurate. Therefore it must be admitted that all statistics, from whatever source they may be drawn, have relative value, and are available for the prognosis but in a limited degree. Without any assistance from pathological histology, bacteriology, and from the experiment on animals, we then have nothing left for our guidance in the consideration of the probabilities of syphilis but the aggregate experience of the medical profession during several centuries, and the opinions of those who have had the greatest opportunity to test the correctness of traditional doctrines by their own observations.

Change in the Character of Syphilis.—These opinions in the course of time have not remained unaltered, owing partly to better means of observation and to the general progress of medicine and its auxiliaries, partly to the undoubted changes in the character and in the course of the disease itself, since at the end of the fifteenth century it first appeared in Europe or began to attract general attention. It is probable that such a metamorphosis is still and constantly going on. Mauriac (Archives générales, November and December, 1892: Étude sur le Pronostic de la

Syphilis d'après la Solidarité de ses Manifestations) feels convinced, for instance, that tertiary diseases of the bones are now less frequent than twenty years ago. In speaking of the alarming increase at the present time of syphilitic affections of the nervous system, he significantly puts the questions whether these conditions really develop more commonly now, or whether they were formerly just as frequent and only failed to be recognized in their relations to syphilis. But this very increase of nervous troubles, now attributed to syphilis, compels us to depict its prognosis, at least in regard to the duration of life and the restoration of health, in much less favorable colors than we should have been justified in doing twenty-five years ago.

It is not the place here to enter upon the investigation of the possible causes of this change; whether treatment, attenuation of virus, diminution of predisposition, or increased power of resistance play a part, is impossible to decide. Certain it is that rarely, at present, do we see a case of syphilis go with regularity through all the conventional stages of its development. But it is just as rare to see a case of syphilis allowed to go without any treatment. Ever since, at the end of the fifteenth century, syphilis became the common property of the entire civilized world, energetic therapeutic measures have been adopted in order to remove its manifestations, mitigate their character, and destroy or eradicate its virus from the human organism. It is therefore almost impossible, in approaching the study of prognosis itself, to entirely eliminate the *influence of treatment* from the course and from the consequences of the disease. For centuries the opinion has almost universally prevailed, and to a large extent is held to-day, that syphilis, if left to itself, will inevitably run through the secondary stage with its more superficial lesions, gradually invade the deeper and more important organs, and finally culminate in the destruction of some organ necessary for the continuance of life. The absolute correctness of this opinion, however, is denied by a number of eminent and experienced observers, who claim that, in many instances at least, and under favorable circumstances, the disease has the tendency to limit itself, and even to die out without any treatment. Diday, who with Zeissl is the principal champion of this doctrine of self-limitation, has put it to the test in a series of forty-three well-established cases. In twenty-six of these no general symptoms of serious character or tertiary manifestations had ever been observed, and the patients were apparently in perfect general health; in eighteen the period of surveillance had extended from three and a half to sixteen years beyond the disappearance of the last manifestations of the disease. In the remaining seventeen cases, however, more serious affections, partly of secondary, partly of tertiary character, had threatened the destruction or impairment of important organs, so that finally treatment had to be resorted to. This *quasi*-experimental proof of Diday's finds more or less confirmation in the experience of others, particularly of Taylor, who have seen patients in apparently perfect health but bearing unmistakable marks of former manifestations of syphilis, who were totally unconscious that they ever had such a disease as syphilis, and had never undergone any treatment for these affections. We shall further find results not much different from Diday's, if we select a certain number of syphilitic patients who are subject to judicious and sufficiently long-continued treatment, and who faithfully submit to all the regulations of their mode of living ordered by their physicians. In a number of them, after the first general eruption, no secondary symptoms will ever again appear, or only very slight affections of limited distribution will be observed. In others the disease will seem to be less controllable by treatment, and will again and again return in more aggravated manifestations, often for several years, and finally cease to show any signs of activity, leaving the patients in a perfect state of health. Such patients may be found to be free from any further trouble for ten or fifteen years or longer, to marry, and to become the parents of strong, healthy children. It is difficult to honestly claim that the final good result and the continued immunity from syphilitic manifestations are the effects of the treatment alone, without acknowledging the possibility or probability that there existed in the disease itself the tendency to exhaust its power and to become extinct. The question may then be asked in every single case that has received treatment, Would not the course of the disease have been the same if no remedies at all had been given? It seems impossible to give an unqualified negative answer, considering the unassailed fact that, under whatever circumstances, different cases vary greatly in severity. In the face, however, of the powerful and prompt effect of specific drugs on the manifestations of the disease, which in the majority of instances follows almost with the regularity of a physiological experiment, it seems but just to claim for our therapeutic measures a large part of the good results and of the final disappearance of the disease, the more so as the experience with untreated cases is but very limited. Zeissl, who agrees with Diday on the principle of noninterference, avows that in practice he has but rarely acted upon it; in the hospital, because, for economic reasons, it was desirable to enable the patients to return to their work as quickly as possible; in private practice, because they were not satisfied with the long delay in the disappearance of their symptoms. It will therefore be more in accordance with the actual facts to consider the prognosis of syphilis under the influence of appropriate treatment, without denying the tendency to self-limitation.

By far the most important question is, *whether there is a complete and absolute cure of syphilis*, or rather, whether the virus of syphilis ever becomes totally extinct or is eliminated from the organism of a human being that has once been infected with it. We have seen that a certain number of syphilitics after a certain time will remain free from all manifestations of the disease and apparently in perfect general health. There is no reason to doubt that they may continue forever in the same condition; nevertheless, we can not pronounce them as absolutely cured, and we have no right to guarantee the continued immunity under any circumstances, because, unfortunately, neither the most minute examination nor microscopic nor bacteriological tests, nor the experiment on animals under the present state of science, afford us any means to prove the absence of the syphilitic virus, whatever that may be. The non-inoculability of syphilis on other but human beings makes it doubtful whether we ever shall be able to divest syphilis of its sharpest sting, of its direst curse, its *uncertainty*. Nevertheless, we can safely affirm, and I believe with the consent of the majority of acknowledged authorities, that *syphilis is curable* on the strength of the indirect proof afforded by *reinfection*. It stands universally admitted that a person who has become infected with syphilis and has developed signs of the infection, will be immune against the further inoculation of the syphilitic virus. If, therefore, such a person develops for a second time a distinct primary sore, which after a period of incubation is followed by secondary symptoms of the same character, as usually observed within a certain time after infection, it can rightly be asserted that this person must have been absolutely free from the influence of its former infection at the time immediately preceding the second infection. There can be no doubt that cases of such a real reinfection have been observed and do exist; although only a very small percentage of all the reputed cases of reinfection which have been published can be accepted as such after scrutinous investigation. Enough remain to establish the fact that persons who were infected with syphilis may lose their immunity against a new infection—certainly a proof that the influence of the syphilitic virus is not unlimited. Although of doubtful practical value for the reinfected person, and although not applicable to the decision of a single given case, it establishes the general fact that an absolute deliverance from the syphilitic infection is not only possible, but actually occurs in a number of patients. For, admitting even that such an absolute cure is an exception, it can not reasonably be pretended that all the exceptions will expose themselves to a new infection, or are bound to acquire the disease for a second time; a certain number of actually cured people must, therefore, always exist, although we can not recognize the fortunate ones. But it is certainly a great consolation that we can conscientiously assure our patients that a cure is possible. It can be asserted with equal right that such complete extinction of the syphilitic virus may take place at a comparatively early date, since several cases of reinfection have been observed within a few years after the first general outbreak. Even with the *curability of syphilis* established, enough remains to render it a very *serious disease*, and to justify the abhorrence in which it is generally held. In the first line *every syphilitic infection involves the appearance of a certain number of symptoms*, however mild a course it may take.

The *primary stage is inevitable;* the initial lesion always exists, although it may be so insignificant that it can be occasionally overlooked. The indolent enlargement of the neighboring lymphatic ganglia will be missed but very rarely. The primary symptoms may disappear before secondary manifestations set in, but in the majority of cases they will extend their existence more or less deeply into the secondary period; remnants of the induration and of the swelling of the glands sometimes outlast several recurrent eruptions of secondary symptoms.

The *secondary stage is equally constant.* It is true that there are a few cases on record in which no secondary symptoms have ever become manifest; these observations include several of the rare cases of experimental chancres which were produced by inoculation of syphilitic secretions on human beings (Rinecker, Anonymous from the Palatinate). Their number, however, is so small that they must be considered as exceptions to the rule and do not affect its validity. Secondary symptoms may entirely cease to appear after the first general eruption, which follows the clonic period of incubation, but usually they recur in more or less prolonged intervals. The syphilides are particularly prone to recur with some regularity in the shape of well-defined periodical eruptions; while the affections of the mucous membranes are far less regular and more likely to persist for longer periods with varying intensity, where previous disposition and local irritations favor their development. Affections of other organs are much more irregular in their appearance. Secondary symptoms in the majority of cases will disappear within from twelve, fifteen, or eighteen months to three years after infection, never to return, leaving the patient in good or perfect health. In localized and more or less fragmentary form they may continue much longer, extend into the tertiary stage, and intermingle with its symptoms.

Tertiary syphilis is a much less constant consequence of the infection than the preceding stage; a large majority of the patients undoubtedly escape it. Its frequency changes considerably under different circumstances, so that reliable statistics are difficult to obtain. Mauriac estimates for Paris that not less than five nor more than twenty out of one hundred patients reach the tertiary stage; five to ten or ten to fifteen per cent will come very near the truth. Other authors do not differ very much in their opinions. Twenty per cent seems to be almost universally acknowledged as the extreme limit. In this country, by many physicians syphilis is held to be of a mild type in general, and a smaller prevalence of tertiary symptoms might then be expected. My own experience does not indicate more favorable conditions than those reported from other countries. The highest proportions of tertiary affections is found in hereditary syphilis; almost equally unfavorable conditions are observed wherever syphilis invades a community or a territory heretofore unoccupied and forms an endemic focus within its limits. In regard to the period after infection at which tertiary symptoms begin to develop, opinions somewhat differ. It is certain that they may appear within the first years, and even within the first months, particularly in hereditary syphilis. In exceptional cases they have been found forty, fifty, and sixty years after the chancre. Mauriac places the time of their appearance in the majority of cases between the third and sixth year. Haslund found by far the largest number within the first twelve years. Fournier (Congrès de Dermatologie et de Syphilographie, 1889), with an experience certainly not inferior to that of any one else, maintains that the relative frequency of tertiary syphilis rapidly rises from the first to the third year, reaches its highest point in the third year, then begins to fall rather rapidly and almost regularly from the fourth to the eleventh year, still keeping within rather high proportions. Within the next ten years, from the twelfth to the twenty-first, the downward movement continues, although somewhat more slowly, to assume afterward an almost uniform but very low level. In fact, within this period tertiary syphilis becomes very rare, and is but exceptionally observed after thirty years.

The *sex* of the patient does not seem to be of great influence, the tertiary cases being almost equally divided between males and females. In regard to *age*, the largest number of cases is observed between twenty-five and forty-five years; this seems natural, in consideration of the fact that the majority of infections will occur between twenty and thirty years. Although in tertiary syphilis the regularity characteristic of the secondary stage is more and more lost, it evidently shows an unmistakable preference for certain localities. The external and more superficial organs of the human body are the favorite seat; the skin, the mucous membranes, the subcutaneous tissue, and the skeleton, among the bones principally those of the cranium, those of the nose and pharynx, and the superficial bones of the extremities, with the tibia in the lead, and the genital organs, following in frequency of tertiary lesions. Among the internal organs, without controversy the nervous system claims first place, overshadowing the others by their frequency, their importance, and often by their precociousness. Fournier even places the nervous system at the head of the list, with 1,085 out of 3,429 cases of tertiary syphilis against 787 affections of the skin, 612 of the mucous membranes, 428 of the subcutaneous tissue, 336 of the osseous system, and 157 of the sexual organs. Other authors, on the contrary, while admitting the wide prevalence of tertiary syphilis of the nervous centers over other visceral lesions, have observed in the majority of cases affections of the external and more superficial organs. Haslund, for instance, among 514 cases has but 133 lesions of the nervous system against 290 of the skin, 131 of the bones, and 96 of the mucous membranes.

Tertiary syphilis in general begins without any prodromata, and often in a quite obscure manner; nor does it show, by any definite signs, where it ends. Its manifestations may heal, either spontaneously or under treatment, almost always leaving some loss of substance or some irreparable functional trouble, and may not be followed by others. Or they may continue indefinitely either in one favorite locality by healing on one place and by spreading in the periphery, mostly in one direction or by recurring in similar form on new places. Some defy all treatment, finally affecting the general health in a more or less pronounced manner, or destroy life by attacking some vital organ.

Within these general outlines *syphilis* may present a *widely different* picture, according to the *degree of intensity* with which it attacks the human organism, or according to the power of resistance which it encounters. Syphilis may be benign or malign, mild or severe; it may preserve a mild character throughout its entire course, or may change from the mild to the severe, and *vice versa*. Benignity principally shows itself by the appearance of the symptoms in that form, order, and manner which is considered *quasi* as normal and regular, because it is observed in the majority of those cases which, treated or left alone, after a more or less extended run end favorably. Benignity, therefore, includes mild, moderate, and even severe cases, according to the number, distribution, duration, and seat of the lesions, the length of intervals between the recurrences, and the resistance offered to treatment. The same factors determine the degree of malignity, which in general consists in the irregularity of the course, the early and continued appearance of more deep-seated and more deleterious lesions which usually are met with at the later periods, the accumulation of symptoms on different organs, and particularly in the formations, immediately or soon after infection, of lesions similar in character to those which generally are observed in the tertiary stage, particularly of the ulcerous syphilide.

The difference in degree of severity becomes manifest in the primary stage: an unusual amount of induration, great tendency to ulceration and phagedenism, represent the aggravated and malign forms of the primary lesion; while slight induration, absence or superficial nature of ulceration, and rapid cicatrization are signs of benignity. The swelling of the lymphatic glands does not seem to bear any definite relation to the severity of the primary lesion; in phagedenism it may be very slight. Suppuration is not a sign of malignity, but is always a complication of syphilis with another infection.

The period of incubation between the appearance of the primary sore and the general eruption of secondary symptoms is usually shortened in malign cases; the prodromata, particularly the accompanying fever, do not seem to bear any definite relation to the severity of the disease; anæmia is often quite conspicuous in cases which finally follow a mild course, nor does the abrupt outbreak of the secondary eruption necessarily indicate a severe form of syphilis.

In the secondary stage itself, the syphilides, the most common and earliest manifestations reflect the mild or severe character of the disease by the degree of infiltration of the cutis. From the macular syphilide, which even in its most superficial forms is marked by a certain amount of cell proliferation, and from the slightly scaly, flat, small papule, the infiltration is found to increase in consistency, extension into the deeper layers and in the periphery, until the broad, hard papule or the more tubercular infiltration and nodules are produced. While all the mild forms have the tendency to entirely disappear, at least as far as microscopical examination is able to distinguish, generally within a short time, the more aggravated lesions leave a more or less intense pigmentation, sometimes quite persistent, or permanent scars of a quite pronounced type. The pustular syphilides, although in themselves indicative of a more severe infection, evince a decided difference in the intensity of the process, transitions being met with from the small pus-containing blister through its modifications to deep ulcers, without a sharp dividing line between secondary and tertiary forms. Suppuration, however, is often due rather to a secondary infection with pus-producing microbes of previously existing lesions of perfectly benign character, and under such circumstances is without significance for the prognosis. In general, the outlook becomes less favorable the more the syphilides approach the gummatous condition with its tendency to softening, peripheral propagation, and disintegration rather than resolution.

In a similar manner the affections of the mucous membranes vary in depth of infiltration and tendency to ulceration; here, too, the line of demarcation between secondary and tertiary lesions may become indistinct. All the other more or less common symptoms, such as marked alopecia, affections of the bones (periostitis) and joints, of the testicles, iritis, general enlargement of lymphatic ganglia, etc., are indications of a more aggravated type of disease.

The appearance of tertiary symptoms must likewise be considered in itself as sufficient evidence of a greater virulence of the syphilitic infection. Their prognosis largely depends on the inherent vital importance of the organs in which they develop. Naturally, it makes a great difference whether the gummatous process invades the skin, or a bone, or the iris, or the adventitia of a cerebral artery. But the character of benignity or malignity is also demonstrated by the area involved, by the rapidity of the development, and particularly by the quality of the newly formed tissue itself. Usually the product of the tertiary process is somewhat unstable; it shows great tendency to softening or cheesy degeneration and to necrosis, involving the ulceration and sequestration of bones. Occasionally it assumes a greater consistency and stability, and, after attaining a certain volume, loses the tendency to increase, and may remain unchanged for a long time. Where it assumes the shape of a well-defined tumor it closely resembles sarcoma or other more or less malignant new growths, not so rarely even under the microscope. In such cases the general prognosis assumes a much brighter aspect if the syphilitic nature is recognized, because the syphilitic tumor, although representing a severe type among its own kindred, opens much more favorable prospects for the results of treatment.

The influence of therapeutic measures on the products of tertiary syphilis is also of great importance for the distinction of the benign or malign character of the disease. In many instances they readily yield to iodides; in others, mercury shows itself more useful, and just as powerful and reliable as in the earlier stage. It is remarkable how rapidly even the most dangerous and precarious conditions sometimes give way to either remedy or to combinations of both. In other cases, however, sometimes of apparently milder types, the effect of treatment may entirely fail to show itself, and the morbid process goes on unaffected by the most persevering and skillful efforts to stop its progress or to remove its products.

The question, on *what this difference in the character of syphilis depends*, what contributes in the single case to its benignity or malignity, is as important as it is interesting, and to a certain extent difficult to answer. Undoubtedly different factors must be held responsible, but for every one such numerous exceptions will be found that it is impossible to accept any strict rules.

It seems plausible enough to ascribe the difference in the course to *different modifications of the virus itself*, as several authors have done. Our deficient knowledge of the nature of this virus so far absolutely precludes any exact proof of such a theory, much less is it borne out by experience. But recently a French writer has tried to prove the individual virulence of syphilis by an observation which showed that a number of healthy males, one after another, contracted syphilis from the same woman, who herself had never presented a severe type of syphilis, and all perished within a few years from general paralysis, which could clearly be traced to their infection. Such an example, although of great interest, is so exceptional that it has no convincing significance. The attempt to show a difference between infection from a primary sore and from secondary symptoms has not been successful either. Others, principally on theoretical reasoning, have sought the cause of malignancy in the large quantity of syphilitic virus (or the large number of microbes) introduced into the organism at the time of the infection; but experience distinctly establishes the fact that it may require but the smallest imaginable quantity of the secretion of some syphilitic sore to produce the most disastrous forms of syphilis.

The least doubt exists about the malignancy of *hereditary* syphilis, although even against this rule numerous exceptions can be brought forward. Much more doubtful, it seems, whether syphilis contracted from a hereditary syphilitic source has a great tendency to produce more serious results, as has been claimed by some authors. The *age* at which a patient becomes infected with syphilis is certainly of some influence on the character of the disease. Children, who acquire it at a very tender age, according to Bäumler, are exposed to almost the same danger as those who inherit it; this, however, is denied by others, who claim to have observed the opposite condition. External circumstances, as poverty, want of care and good nourishment, may contribute a good deal to aggravate the influence of the infection itself, and this may account for the discrepancy of opinion. It must be conceded that the symptoms appear in a more acute character and follow each other in shorter intervals, owing to the greater activity which is peculiar to physiological as well as to pathological processes in children, but thereby the entire course of the disease becomes shortened and less detrimental to general health. With advancing years, particularly in children from ten to fourteen years, the conditions seem to be favorable in general; at least in my own experience, a number of such cases have hardly manifested any secondary symptoms at all. In elderly people, however, and particularly in those who are approaching or have entered the senile age, syphilis assumes more aggravated forms. The reactionary effort of the whole organism against the invasion of the morbid agent, and the combined action of the healthy forces to get rid of the invader—which really seems to be the meaning of the general eruption following infection—can not be produced in so vigorous a manner by the waning energy of the aged, therefore it takes longer to overcome the effects and to free the blood of the poison. Hence, the symptoms develop more slowly, persist longer, either by frequent recurrences, or by extending to deeper layers of tissue, thus often approaching tertiary forms. Nevertheless, after a certain time, the syphilis of the aged may entirely disappear like that of youthful patients, and the danger of the development of visceral affections seems to exist only in a small degree.

The *sex* of the patient plays, too, a certain part, perhaps more in shaping the outward features than in determining the intensity. There is hardly a doubt that in females oftener than in men syphilis pursues a very mild course—so mild, in fact, that it is liable to be entirely overlooked. Anæmia, functional troubles of the nervous system, as headaches, neuralgia, etc., prevail, and often conceal the syphilitic infection. It is not improbable that roseola and the mild papular syphilide occur much oftener in women than they are actually observed by them, because they have less occasion to expose themselves to inspection; this can be said with more right even of the primary lesions of the sexual organs. Physiological conditions peculiar to the female—menstruation, gravidity, climacterium—do not seem to interfere much with the course of syphilis; and the internal organs of reproduction themselves, the uterus and the ovaries, with the exception of primary lesions on the former, are probably the least affected organs in syphilis. It ought to be expected, at least, that the wholesale extirpation of these organs at the present age should have brought to light numerous specimens of syphilitic ovaries or syphilitic endometritis or gummata of the uterus, if they existed; still, we hear very little of such occurrences. Gravidity occasionally seems to be accompanied by exacerbations of syphilis; abundant loss of blood during menstruation is due more to the anæmic condition and the malnutrition incidental to syphilis than directly to the disease itself. That the female sex is not exempt either from severe and malign forms in general, or from tertiary symptoms in particular, is proved by numerous observations. The statistics of Haslund and Fournier show but very little difference in the distribution of tertiary cases among both sexes.

As to the *seat of the primary infection*, numerous observations seem to have furnished proof to some authors that extra-genital chancres are more regularly followed by serious symptoms, those of the fingers being regarded the most dangerous ones. In conformity with that of many other physicians, my own experience does not confirm that rule. To my surprise, I have observed in a considerable number of cases a mild course of syphilis, chancres of the lip and face being most frequently represented. On the genitals themselves it matters little whether the chancre is situated on the prepuce, the frenulum, the glans, the sulcus coronarius, the orifice of the urethra, the labia majora or minora, etc., the local symptoms only, and probably the swelling of the glands, being more dependent thereon.

The influence of the *constitution* and of the condition of the *general health* of the patient at the time of infection on the course of syphilis is much more definite, not so much perhaps on the number and character of the secondary symptoms as on the final result. It seems but natural that in a healthy organism, with all its functions in good working order, the combat against the syphilitic virus should be fought with greater energy than in a weak one, but that in the end the former will be better able to free itself of the intruder without any permanent detriment, than the latter, in which the progress of the disease may be less vehement, but so much more insidious and persistent.

It is not uncommon to recognize a predilection of the syphilitic process for those organs which, previous to the infection, showed a local weakness or predisposition to readily succumb to other morbid agencies. Patients, for instance, who were habitually subject to tonsillar and other throat affections are particularly liable to suffer from severe attacks of throat syphilis, and rheumatics will more easily develop specific joint affections. Fournier but recently has maintained that the large number of syphilitic nervous disorders is due to a disposition, either from inheritance or from other causes, to develop nervous troubles, and that syphilis is only one of the immediate or accidental causes, although a frequent one, which favor or precipitate the outbreak of the latent tendency which would sooner or later have manifested itself even if the patient had not become syphilitic.

A decidedly disastrous result must be expected in those cases in which syphilis *complicates other constitutional diseases*, particularly tuberculosis and scrofulosis. Malaria is almost unanimously acknowledged as largely favorable to the development of malignant and protracted syphilis, principally tertiary symptoms.

It is evident from the foregoing why the *habits* and *mode of living* of the patients have much to do with the character of syphilis; why irregularity of life contributes a good deal to the severity of the disease, and excesses in *Baccho et venere* are largely responsible for disastrous results of the infection. Excitement in business, cares and troubles of all kinds, overwork, particularly excessive brainwork, often associated with want of sleep, increase the danger from syphilis. On the other side, it can be easily observed that regularity of life and habits, moderation in pleasure as well as in work, sufficient sleep, conscientious attendance to all the wants of hygiene, and regulation of all the animal functions of the human body, and a certain amount of philosophy in accepting the responsibilities of the infection and in submitting to the inevitable, greatly tend to mitigate the bad influence of the infection. If a patient, by the consideration of his syphilis, is induced to give up reckless living and dissipation, he may indeed find himself in better health after his syphilis than he probably would have been without it; and it may indeed become true that syphilis exerts a wholesome influence on a person's health and entire life, and in this sense may prove to be a blessing in disguise. Unfortunately, such cases are not the rule, and too rare to affect the prognosis of syphilis in a great measure.

As to the use of *tobacco* in its different forms, there can be no doubt that it may often aggravate affections of the mouth, tongue, and throat by the incidental local irritation, and a total cure of these symptoms is often impossible until the habits of smoking and chewing are entirely given up. Excessive smoking may exert the same injurious effect on the nervous organs in syphilitics as in nonsyphilitics, while moderate use will hardly be considered as harmful in regard to the course of syphilis. Whether the moderate use of *alcoholics*, particularly of the milder beverages such as beer and wine, is likely to unfavorably affect the course of syphilis, seems open to some doubt; it can not be ascertained that, in countries where drinking is an almost universal habit, syphilis is a more serious disease than in others where this is not the case, because it is impossible to find any large territory where alcoholic beverages are not used to a certain extent, whether openly or clandestinely. It seems, however, injudicious to suddenly enforce total abstinence on a person, who has been taking moderate quantities of alcohol for years, as soon as he is infected with syphilis; it would seem rather to add another weakening factor to that represented by the disease, and to render the organism less able to combat the virus by the withdrawal of one of its regular means of support. The effects of stronger liquors on the nervous organs, the liver and kidneys, are too well known to admit of much doubt that they ought to be avoided as far as possible by syphilitics.

As the last of the factors which contribute to the character of syphilis we have to consider the effects of *treatment*. There will hardly be any objection to the statement that a judicious, methodical, and sufficiently long-continued treatment not only causes a quicker disappearance of the symptoms actually present, but is able also to prevent their recurrence, to reduce their severity, and to considerably shorten the active period of the disease itself in those who apparently get well. It is, however, by no means irrelevant at what period treatment is commenced. The temptation to begin it before the appearance of any secondary symptoms is certainly often very great, but the suspicion seems to be well founded that the early treatment favors a more irregular course of syphilis, and as a rule does not prevent but only delays the secondary symptoms, which then have a tendency to appear in an aggravated form. With every year I find the impression gaining upon me that the initiation of treatment during the period of incubation not only does not offer any advantages but does positive harm. Delayed treatment, or the too early cessation of it, is undoubtedly equally responsible for numerous cases of aggravated and recurring secondary symptoms, and greatly favors the development of tertiary conditions. Cases in which obstacles arise against the regular application of the usual remedies, either from the intolerance of the stomach or from injurious effects upon the general health, usually offer great difficulties and severe symptoms. If mercury alone is not tolerated, sometimes the iodides may be sufficient to check the course of the disease; but occasionally the organism refuses to bear either remedy, and unless circumstances afford the advantages of favorable climatic, dietetic, and hygienic measures, we see the patient go from bad to worse, in spite of all our efforts to stop the progress of the disease.

Syphilis is *not* a disease which ordinarily *causes much pain* or direct *suffering*, not, at least, in the primary and secondary stages; much oftener it becomes a source of inconvenience and embarrassment if the situation of the lesions betrays the presence of some disease, and, to the knowing ones, its nature. Primary sores on the genitals are not generally very painful unless they are neglected, or unless they are deeply ulcerated or phagedenic; in the latter instance the pain may be intense and of neuralgic character. In extra-genital chancres much depends on their seat. On the lips, the tongue, the tonsils, and on the eyelids, they may cause great inconvenience, and often pain, not to speak of the offensive aspect of all such lesions in the face, particularly of women. Neuralgic pains through the entire extremity have not infrequently been observed in chancres of the fingers. The syphilitic bubo is but seldom really painful; a certain sensitiveness, particularly after rising from a sitting position, or after a long walk, is not unusual.

The general symptoms preceding and accompanying the outbreak of the first secondary manifestations may become quite severe, by the intensity either of the fever or of the rheumatoid pains in the chest or of the headache, but, as a rule, for a short time only, relief following almost immediately on the commencement of treatment or spontaneously. The syphilides of macular and papular character, as a rule, do not cause any sensation, neither itching nor pain; moist papules or broad condylomata around the anus, on the scrotum, and on and around the external female genitals, may become very sensitive and painful, the more so the more the rules of cleanliness are neglected. The pustular and ulcerating forms, as long as they are covered with crusts, do not cause great inconvenience, but if unprotected and allowed to stick to the clothes and on the localities where two surfaces come constantly in contact, as in the anal region, on the scrotum, in the axillæ, on overhanging breasts, between the toes; or which are exposed to friction from the clothes, as above the heel, on the knee, on the wrists, etc., they often become the cause of intense suffering.

Throat affections may be almost entirely painless, but in the majority of cases are accompanied by difficulty and soreness in swallowing; the sensitiveness sometimes becomes more pronounced when the ulcer begins to free itself of the necrotic tissue and to expose a more healthy granulating surface. Tongue and lip affections even of superficial character are usually quite sensitive, particularly during eating, and occasionally render chewing almost impossible. Bone and joint affections are often accompanied by pain, principally at night, and by great sensitiveness against even the slightest touch or pressure. Iritis, finally, in the majority of cases, is painful, and necessarily always the source of some inconvenience on account of the inability of using the eye.

The tertiary affections of the skin and subcutaneous tissue are not, as a rule, connected with pain, unless it depends on their seat, while those of the mucous membranes are more liable to cause distress, those of the tongue in particular. Diseases of the bones of the nose and palate, which often lead to perforations and other defects, are among the most afflicting symptoms; but the most deplorable condition is that produced by the disfiguration of the shape or by ulcerative defects of the nose, and of the face in general. The "dolores osteocopi" accompanying affections of the bones of the cranium or of the extremities are generally quite severe and excruciating, the disturbance of the sleep rendering their effect particularly grave. Visceral affections may cause but very few subjective symptoms, but ordinarily do not differ much in this regard from similar affections resulting from other causes. Those of the nervous organs, however, including troubles of peripheral nerves, naturally imply much more severe subjective symptoms, and are the source of intense suffering. The peculiar ulcerative processes of the rectum due to syphilis, with the obstruction of defecation, must also be mentioned as among the most painful affections; while gummata of the testicles are distinguished from other new growths by their indolence and absence of subjective suffering.

The general health, as we have already had occasion to mention, may be left entirely unimpaired by syphilis, and many patients are finally restored to the full enjoyment of health and life. But in a large percentage of cases the *disease leaves its mark on certain parts of the body* either in the shape of some loss of substance or of some functional disorder, or produces a low state of general nutrition. The anæmia and cachectic condition often observed in the early stages, principally in women, may entirely disappear, or may return with every new eruption of symptoms, or may become more or less permanent, outlasting sometimes all the actual symptoms of the disease itself. In this way a not very conspicuous but nevertheless deeply rooted weakness of the entire body may remain for life, implicating a reduced power of resistance against other morbid agencies, and increasing the danger resulting from other diseases. More decided marasmus or pronounced syphilitic cachexia is observed either as the only symptom after long duration of the disease or as a complication and sequelæ of visceral syphilis, or long-continued and ulcerative and suppurative processes in the external integument or of the bones.

Locally, the influence of syphilis is observed in various ways. Primary lesions on the genitals in most instances are without much importance;

deep ulcerating chancres may cause some disfigurement, particularly of the glands, but phagedenic ulcers may cause horrible destruction of the penis, even so as to render it unfit for some of its functions, and to necessitate operations for the restoration of natural micturition. Extra-genital chancres often leave ugly and unsightly scars on the eyelids; with the more serious conditions of entropium and ectropium, scars on the finger-tips may interfere with the tactile usefulness of the fingers.

Among the secondary symptoms, iritis must be named first in importance on account of adhesions and their disastrous tendency to inflammatory processes and permanent impairment of the functions of the eye. Superficial skin affections leave only pigmentation for a more or less extended period; some of the papular syphilides leave superficial scars; but the pustular eruptions as well as the precocious ulcerative forms produce permanent and more conspicuous scars. Leucoderma syphiliticum is generally of great persistency, and by its principal seat on the neck and shoulders of women may often become inconvenient and disfiguring. Defluvium capillorum may lead to permanent premature alopecia, or leave the hair at least much thinned. The affection of the mucous membranes are not without serious consequences; chronic catarrhs, thickening of the mucous membranes, or the dry atrophic condition of the posterior wall of the pharynx, and particularly loss or impairment of the voice resulting from larynx affections, may remain. Leucoplakia of the tongue and oral cavity often follow syphilitic lesions. Early periostitis causes permanent thickening and rough surfaces of superficial bones, mostly of little practical importance.

By far more conspicuous are the permanent sequelæ of tertiary lesions. Scars on the outer integument are the most numerous, owing their importance almost alone to their seat; those of the face and other exposed parts naturally are the most disagreeable ones. On the legs the gummatous process frequently produces ulcers which become permanent, and after a while can hardly be distinguished from the ordinary ulcer of the leg, all the disadvantages of which they share. More deeply seated gummata cause more or less extended necrŏsis of the bones, which is often found on the cranium; on the extremities they may render the patients invalid forever. Perforations and other destructions of the nose and palate, pharynx and larynx, are among the most dreaded consequences of tertiary syphilis. Visceral syphilitic affections hardly ever admit of a permanent cure; although they may apparently heal, certain changes in the structure will always remain, which not only render the functions of the organs imperfect, but also favor the recurrence of trouble on the slightest provocation. This is particularly true of the affections of the nervous system; their prognosis is always an uncertain one. Nevertheless, in visceral lesions resulting from syphilis, and mostly again in affections of the brain and spine, as in epileptiform convulsions, in different forms of paralysis, aphasia, tumors, etc., not less in lung syphilis, the prognosis becomes relatively better than if the same or similar symptoms are due to other causes, because there is always a certain hope left that antisyphilitic treatment may be followed by the partial or complete disappearance of even the most dangerous conditions. Often, however, the effects of the treatment are not so favorable, the less so the more the anatomical structure of the organs has been interfered with.

Of particular importance is the effect of syphilis upon the *procreative faculties* of *syphilitic parents.* The influence of local manifestations of the sexual organs is comparatively small. We have stated already that the uterus and the ovaries are rarely affected by syphilis; it seems as if the faculty of conception was not interfered with at all. In many cases we find that a new pregnancy follows an abortion or premature birth after a very short interval, and the number of miscarriages recorded for a single woman is often quite astonishing. In the male, affections of the epididymis and testicle may and actually do produce azoöspermia; there are cases on record in which this condition was found to disappear under specific treatment, while in gonorrhœal epididymitis a cure is but exceptionally observed. Defects of the penis after phagedenic ulcers may cause impotentia coeundi. All these local influences, however, are of little consequence compared with the conveyance of the syphilitic virus to the fœtus.

The only question which has to be considered here is whether *syphilitic parents can have healthy children* at all, and *how soon after infection* this may be expected. There can be no doubt that the effect of syphilis on the condition of the offspring usually wears out after a certain time. Syphilitic fathers are likely to produce syphilitic children as long as the active period of the disease lasts, and we therefore must not expect that before the end of the second or during the third year after infection their children will not show any signs of hereditary syphilis. Many instances are known where healthy children were born even within this period, but marriage ought not to be permitted or advised before the third year. On the other side, observations are not wanting that syphilis appeared in children long after the cessation of all symptoms on the father himself, and that after renewed treatment of the father healthy children were born. Syphilis of the mother affects the fœtus much more regularly and much more intensely than that of the father, and observations that children were born during the active period of syphilis of the mother and lived in healthy condition are extremely rare. Even where no manifestation of any kind can be detected, or where no outward symptoms have ever been observed, mothers sometimes continue for years to have miscarriages, stillbirths, either prematurely or at full term, or to bear children with symptoms of hereditary syphilis. Nevertheless, the farther away from the third year after infection the greater becomes the probability that mothers will have healthy children. The birth of one healthy child does not assure the complete extinction of the syphilitic influence, since it is not so rarely observed that a miscarriage or stillbirth or a syphilitic child follows after it. Sometimes all the children of one sex are born healthy, while those of the opposite sex succumb to the disease, or healthy and syphilitic children alternate without any apparent change in the health of the mother. Tertiary syphilis of the parents is of much less influence on the health of the children, and parents with undoubted tertiary symptoms may have children entirely free from any syphilitic taint. It can not be denied, however, that such children may develop symptoms of scrofulosis, and frequently those of rickets. Under such circumstances these diseases show no peculiarities of any kind which would reveal a connection with syphilis, nor are they open to the influence of antisyphilitic treatment. Unquestionable cases of propagation of syphilis into the third generation with immunity of the secondary hardly exist.

Hereditary syphilis leaves the most numerous and the most intense marks of virulence. In regard to the general health, we have seen that it often manifests itself by the poor development of the entire organism, which gives to its victims a more or less puerile appearance. Smallness of stature, the stupid expression of the face, the abnormal formation of the head and face, characterize many hereditary syphilitics, the malformation of the teeth, the affections of the eye and ear adding to their deplorable condition. Nowhere else are the destructive processes of the nose and throat observed so generally and in such disastrous forms, and no class of syphilitic patients furnishes so large a percentage of nervous affections. In both sexes sterility is not an uncommon occurrence due in the male to early affections of the testicle, and in the female to atrophy and defective development of the uterus and ovaries.

It has become sufficiently evident from the foregoing that syphilis produces numerous conditions which ultimately end fatally. It therefore can not be denied that *syphilis* in many cases has to be considered as the indirect *cause of death*. Visceral affections furnish the majority, those of the nervous system again taking first rank. They may cause death abruptly, mostly by apoplectic attacks due either to occlusion of arteries, rupture of aneurisms, and similar accidents, or may take a slow course, resembling that of tumors of the brain. The chronic affections of the spine, like tabes and similar forms, must likewise be considered as frequent consequences of syphilis with fatal result. Affections of the heart, lung, liver, and kidneys are also responsible for the fatal exitus in a number of cases. Marasmus with amyloid degeneration of the organs may be the immediate and last cause of death after ulcerative processes of the skin and subcutaneous tissue and after chronic bone affections. Although it does not seem so difficult to trace the fatal result in many instances to its real source, it can safely be assumed that often the connection of the death with syphilis remains unrecognized. It is therefore very difficult or impossible to give any exact data of the actual mortality from syphilis.

Acquired syphilis but very rarely becomes the *immediate* cause of death. Fatal hæmorrhages from erosion of larger blood-vessels in ulcers have occasionally been observed, otherwise only the severity of the general eruption of syphilis may sometimes cause the death of individuals weakened by previous diseases or of feeble constitution, particularly if very tender or very advanced age add their influence. In hereditary syphilis, on the contrary, the direct mortality is very great, although it is almost equally impossible to give exact numbers. It can be stated without hesitation that a large percentage of syphilitic children perish during intra-uterine life, while out of those who are born alive a great majority die within the first year. Considering the wide distribution and the great frequency of syphilis, it seems quite obvious that it must exert a vast influence on the vitality of entire populations. In France it has been publicly recognized as an important factor in the depopulation of that country.

It remains to consider how far it is possible to shape the *prognosis in every single case from the symptoms* which its presents. Naturally the general conditions, which have been reviewed so far, must furnish the principal guidance for our judgment. Since we have seen that it is impossible to recognize any absolute laws, and that an opinion obtained from a large number of observations is often reversed by numerous exceptions, great caution is necessary that we do not allow our predictions to assume the appearance of absolute reliability.

The primary lesion more than any other symptom invites to a certain degree to draw conclusions as to the future course of syphilis. Erythematous chancres, superficial erosions with parchmentlike induration, are usually followed by superficial syphilides in the beginning of the secondary stage, but they do not exclude later ulceration or other tertiary processes. It has been the experience of many observers that cerebro-spinal affections occur more frequently after mild chancres with mild secondary symptoms. Ulcerous and phagedenic chancres are more regularly followed by ulcerous syphilis, not only of the skin and mucous membranes but also of the bones. Occasionally secondary symptoms may again succeed early tertiary symptoms. Visceral syphilis is less to be expected in such cases. Some authors consider voluminous induration as a sure sign of a severe course of the disease. They calculate that from such a source an abundant supply of the syphilitic virus would be distributed through the blood and the entire body. This seems plausible enough, but with our uncertain knowledge of the nature of this virus itself the correctness of the theory can not be acknowledged. Other physicians, among them Mauriac in the above-cited memoir, deny this influence. The experience that, after the early and apparently locally successful extirpation of the primary lesion, syphilis of severe type has often developed, must not be overlooked. The swelling of the lymphatic ganglia is not of great importance, although the same theoretical reasoning might suggest the contrary expectation. Under no circumstances is it allowed to predict from the primary sore the course of the disease beyond the general eruption immediately following the period of incubation. In the secondary stage, the regularity which forms so characteristic a feature of syphilis is more prevalent than in any other. Accordingly, we may tell the patient that he is likely to have some throat affection or a new eruption on the skin, but of what character these manifestations will be is more difficult to say. A roseola returns but very rarely for a second time, and then usually at a late period; it is more probable that a papular syphilide will follow, but of a more or less limited distribution. Broad condylomata are comparatively less frequent in this country than in European countries, probably on account of the more general observation of the laws of cleanliness. Among the better situated classes of patients they are but seldom met with. Where they once appear they have great tendency to recur obstinately. Throat affections show the same inclination for recurrences within the first year, greatly favored by the inclement seasons.

The frequency with which certain symptoms on different organs appear simultaneously may sometimes allow the prediction from the appearance of one member of such a group the probable development of the other. The combination of a roseola crust on the hairy scalp and *plaques muqueuses* of the throat has been mentioned before. The coincidence of tongue affections with those of the palms and soles, and that of iritis with papular and pustular syphilides, are memorable examples of such combinations.

The cerebro-spinal affections are the least regular in their appearance, and do not seem to have any certain relations to other symptoms nor to the period in which they appear. Their form and severity are the same in the early period as in the later ones. The prolongation of the secondary period and the frequent recurrence of its symptoms are not of unfavorable significance for the final entire recovery and immunity from tertiary symptoms.

The irregularity and capriciousness of tertiary syphilis as to its topography, chronology, and termination, forbid almost every calculation as to its development and final course. Simultaneous affections on different organs usually bear the same character of benignity or malignity, although they may appear under an entirely different form. Several peculiarities of some of the symptoms and their combinations are of certain value for the prognosis. Syphilis of the nose and pharynx is found, but rarely associated with that of the larynx; while laryngeal syphilis is prone to affect the trachea and the lung, the tendency to descend being manifest in the air-passages. Lung and liver are frequently affected at the same time; so are kidneys, spleen, and liver. A peculiar combination is that of paralysis of several muscles of the larynx and of the eye-muscles, sometimes with hemianæsthesia of the face, which probably can be traced to a common central affection. The frequency of such observations makes it imperative for the physician, in the presence of one of the symptoms to watch for the actual or future development of the other. In all cases of tertiary syphilis the prognosis as to their consequences principally depends on the seat of the lesions. In regard to the final termination no certain prediction can be made, and even under the most favorable circumstances we can not give the positive assurance that the definite end has been reached.

In looking back over all that has been said in regard to the probabilities of syphilis, at first glance the picture presented seems to be a rather gloomy one. We see a disease, which extends over an indefinite time, even under the most favorable conditions over months, involving usually but little suffering, but liable to cause permanent injury to single organs or to the general health, and indirectly becoming the cause of death in a number of cases. There is nothing to relieve the dark prospects of hereditary syphilis, which in a large majority of all cases becomes the direct cause of death, and among the survivors evolves its most malignant, dangerous, and fatal features, leaving so few favorable cases that they almost seem to be exceptions to the rule. But in regard to acquired syphilis the aspect becomes much brighter, if we reflect that almost all the serious and dangerous features are concentrated in tertiary syphilis; that only a certain percentage of all cases of syphilitic infections, probably not exceeding twenty per cent, are likely to reach the tertiary stage, and that out of these twenty per cent or less some are of benign character and amenable to a final cure, particularly under the beneficial effects of treatment. This leaves for the majority of all cases the prospect that after the development of a series of more or less severe symptoms, extending from a few months to two or three years, or sometimes longer, the disease will cease its activity and will become extinct without leaving any serious consequence. The uncertainty of this apparent cure remains as the most oppressive and pernicious feature of syphilis; while the generally ready and sure relief afforded by treatment greatly helps to redeem its character.

THE TREATMENT OF SYPHILIS.

BY J. WILLIAM WHITE, M. D.

THE *materies morbi* of syphilis, as far as it is clinically demonstrable, consists of a serous fluid, in which are found a small proportion of floating particles, consisting of pus, epithelial cells, and granulations. This can only be once inoculated into the individual system, and, when so inoculated, produces in a short time symptoms that demonstrate its intense virulence and distinguish it from all other contagious or inoculable substances. To which of its constituents it owes its power we are not able to say dogmatically. Bacteriologists have not as yet proved the microbic origin of syphilis. To do this in the case of any disease the micro-organism must be found, isolated, reproduced in pure cultures, and inoculated on healthy individuals with the effect of causing the development of the characteristic symptoms. This has not been accomplished in the case of syphilis. And yet its analogy to other microbic diseases in which the source of contagion has been proved, and the recent researches of Bouchard and Chauveau, indicating that the severity of the disease is proportionate to the amount of infection, justify us in believing that this specific poison or virus owes its intense virulence to a micro-organism, or to the albumoses, toxalbumins, and other products of fermentation produced by microbic action.

Legislation in Relation to Syphilis.—In discussing the treatment of a disease which is thought to owe its origin to a pathogenic organism, a specific cause, modern science demands consideration of the possibility of preventing the spread of the contagion, or of eradicating it by destroying the source of infection. The contagious diseases acts of Great Britain, and the various laws of other countries for the restriction and regulation of prostitution, aim at accomplishing this purpose.

The testimony (which need not be recapitulated here) of Thiry, Kaposi, Neisser, Pizzsingskold, Neumann, and others, given at the Tenth International Congress, and the opinion of the profession at large in each country where they have been tried, constitute conclusive evidence of the prophylactic value of these measures. Neumann, in the following summary, formulates the essential requirements for success in the limitation of the spread of syphilis: "Prostitution should be under Government control. There should be compulsory examination of all prostitutes. If diseased, they should be sent to special hospitals for treatment. During the early secondary period the most severe restrictions should be observed. Soldiers and sailors under Government control should have periodic examinations, early and prolonged treatment in hospitals, and should be kept under supervision after apparent cure." In addition, he urges the examination of factory hands and of wet nurses; the state regulation of vaccination and circumcision; the establishment of a large number of hospitals for syphilitics; and the passage of international laws regarding syphilis and prostitution.

It may be admitted that no method has as yet been devised which is in all respects unobjectionable or is capable of universal application. I may add here also that, while advocating the general principle of supervisory legislation as applied to prostitution, I am fully aware that in the details of every plan yet proposed there has been much that was defective or positively harmful, and that the subject is still one of the unsolved sanitary problems of the age. The direction in which action must be taken, and the general character of that action, may nevertheless be indicated if not demonstrated.

We may begin, without much fear of contradiction, by urging the necessity of a more general and more accurate public knowledge concerning the gravity and the prevalence of this disease. The innocent, who are also in this respect the ignorant members of the community, have claims which we, who seek to fulfill the highest function of our profession—the preservation of health, individual and national—can not conscientiously disregard. Every adult citizen should be aware, for his own sake, of the possibilities of contamination which surround him; every parent should be competent to protect his wife or children from all indirect infection through a servant or playmate, a household utensil, or a toy; every wife should know that by permitting the approaches of a syphilitic husband she herself becomes liable to the disease, and to the creation of a being which has few chances for life and still fewer for health or happiness; and every syphilitic should realize that, except after certain intervals and under proper restrictions, his marriage is an outrage to the woman he professes to love, and a crime against society.

Once let these facts be clearly understood and this information widely diffused, and an important step will have been taken not only in preventing accidental and guiltless contagion, but also in preparing public opinion for the legislative measures which are believed to be desirable. Another good result would in all probability be a diminution in the number of cases of this class of disease, who, in ignorance of the gravity of their ailment, consult the quacks and irregular practitioners who find here their favorite and most lucrative field. It is safe to say that the fees of the patients with venereal disease annually maltreated by charlatans, advertising doctors and apothecaries, would comfortably support all those younger members of the profession into whose hands they ought naturally to fall, and who now undergo the usual and often unsuccessful struggle for existence.

For these reasons—first and especially the public welfare, and next our own personal interests—we should in every proper way encourage the presentation of this matter to the community at large.

Having as far as possible closed the accidental avenues of infection, we have to deal with the fact that, although many cases may thus be prevented, by far the most frequent mode of transmission of syphilis is through illicit sexual intercourse, carried on largely by means of a multitude of women who thereby earn a livelihood, and by a still larger number of men who furnish their means of support.

This fact has given rise in many countries to numerous efforts at legal control and supervision of the vice. The general fundamental principles which have been observed or advocated require the registration of each prostitute, her inspection once every week or ten days by a competent medical officer, her sequestration whenever she is found to have any contagious disease, and her retention until she is completely cured; together with, in some proposed laws, the examination of all immigrants before admission to the country, and their treatment and cure if found diseased.

The practical results of these repressive measures in Great Britain, France, and Russia, are fully considered in the article on Syphilis in Relation to Public Health.

In this country the experiment was tried in St. Louis, where the ordinance for controlling prostitution embraced something of the Parisian system, but was an improvement upon it in several respects. This ordinance, which was in force some years back, and then was repealed, gave the Board of Health and police department authority for the registration of all prostitutes, provided for their periodical examination by official physicians, and gave the power to isolate in the female hospital those found to be diseased. The women were compelled to pay a weekly stipend, which was expended solely for their benefit, and went to the support of their hospital. They were entitled to care in this institution not only when suffering from venereal disease, but also when sick from other causes.*

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* "After this scheme had been in successful operation for a length of time, the point was raised, especially by the clergy, that this was nothing more than a licensing of prostitution, and therefore an infamous compact with sin and Satan. This class of moralists was re-enforced by others, who claimed that the physical explorations were a degradation to the sex generally, and insisted that these examinations should be extended to male offenders against morality as well. These various arguments the Legislature conceived to

It may be admitted at once that, if the total abolition of prostitution could be accomplished, it would be a consummation devoutly to be wished.

No one, however, in our profession at the present day believes in the possibility of attaining such an end. The accumulated experience of mankind constitutes a wall of unanswerable argument. All attempts at the extinction of prostitution present throughout the centuries one unbroken record of failure. Wherever this scheme has been tried, the sexual impulse, the strongest to which human nature is subject, has asserted itself, and other laws have been violated, other and graver evils have resulted. The remedy has proved worse than the disease. Seduction, illegitimacy, criminal abortion, and infanticide have invariably followed, and the total average morality of the community has been seriously impaired.

Constantine, Justinian, Louis IX of France, and Philip IV of Spain, at different eras in the world's history, attempted the repression of prostitution, and endeavored to enforce it with all the powers of army, church, and state at their backs; but in each instance the attempt was a conspicuous and a complete failure, as it was also in Austria, Bavaria, Rome, and Paris, where the same experiment was tried on different occasions.

Many of the evils which have arisen and still arise from the existence of the lower strata of prostitutes are unquestionably due to the persistent manner in which sanitarians, legislators, and society at large have ignored them—a behavior dictated by unreal modesty and unsound religion, and for which society has, through the devastation of preventable disease, been punished a hundredfold. The recognition of prostitution by the state for purposes of control does not in the slightest degree convey the idea of approval or encouragement, as is often asserted by those in opposition. Laws authorizing certain individuals to sell liquor upon the payment of stated fees, or after complying with definite requirements, do not compel those persons to engage in the liquor traffic, and can not be considered as promoting intemperance. They recognize the fact that liquors will be sold in spite of all efforts to the contrary, and endeavor to bring the evil within proper limits by forbidding all persons except those voluntarily placing themselves under certain restrictions to enter into that business. They are plainly deterring influences, and are so regarded by all except the Utopian reformers who hope to abolish intemperance entirely. The parallel as regards the subject in hand is a very close one, and the inference is obvious.

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be of sufficient cogency to cause the downfall of the system, and in its stead a mongrel sort of repressive bill was passed. Under this new act the brothels of the city have been constantly raided by the police, the women taken before the justices and fined, or, in lieu of payment, sent to the workhouse for a term of weeks. It was an entire failure."—*Boston Medical Journal, January 9, 1879.*

It is taught from the pulpit that "the wages of sin is death," that disease follows transgression as a divine retribution, and that to diminish the risk of an offense against morality is to encourage vice. Does any one suppose that the gentlemen who use these arguments would be willing to follow them to their legitimate conclusion, and encourage disease in order that each transgressor should be certain of receiving his due punishment? But the whole tone of thought implied by their attitude is so foreign to a proper professional spirit, that it is only necessary to mention it to medical men to secure its condemnation.

As regards the alleged illegal interference with the liberty of the individual involved in the forced inspection of the prostitute, there seems to be no question that much more marked interference takes place in other directions without exciting unfavorable criticism, and that the argument is not based on sound legal grounds, as the right of the state to protect the health and lives of its citizens by every available means is universally conceded.

It is urged, too, that the false sense of security which may be established in the minds of young men who are cognizant of the supervision and examination of prostitutes will be a powerful encouragement to vice, while at the same time it must be admitted, by every one practically familiar with the subject, that many forms of venereal disease in females, and above all the initial lesions of syphilis, are difficult of recognition. This, however, is again an argument directed rather against a defective system. If the facts, plain and unvarnished, were once fully recognized and understood by the community—if every young man knew, as he should know, that in spite of careful examination there was still a possibility, not by any means remote, that he would contract syphilis—it may be doubted whether there would be much increase of illicit copulation. On the other hand, although all sores are not discoverable, very many are; and as the disease spreads in a geometrical ratio, the cutting off of even one source of infection would counterbalance, in its physical effects, a decided increase in numbers of those exposed to contagion.

It can not be urged with any force that the establishment of free hospitals and of gratuitous medical service for the treatment of syphilis would greatly lessen the prevalence of the disease, at any rate among prostitutes and their associates. The testimony of all hospital surgeons, to which I wish to add my own, is to the effect that the lower classes of venereal patients seek relief only when symptoms are urgent, and stop treatment at the earliest possible moment, usually when but half cured.

The points which seem to me of chief importance in regard to this subject are:

1. That in syphilis we are dealing with a bacterial disease of such demonstrable antiquity that it is evident that it has no tendency to be-

come extinct; but, on the other hand, is likely to continue indefinitely. 2. That this disease affects a large number of the population, and that by means of its many forms of inoculation and transmission it is constantly spreading still further. 3. That the existing means for its treatment among the poorer classes are insufficient, and that the establishment of institutions for that purpose, or the endowment of special wards in general hospitals, is a measure eminently worthy of the attention of the public-spirited and benevolent. 4. That its most common mode of propagation is by irregular or illicit sexual intercourse, and that therefore the main effects at prevention should be made in this direction. 5. That prostitution, arising in response to the demand for this illicit indulgence, has, like syphilis, existed from time immemorial, and is not likely to disappear. 6. That prostitutes themselves need protection, and have claims on the humanity of the law. 7. That by means of supervisory legislation and control of prostitution the unlawful sexual commerce of the world may most readily be restricted, and the spread of this disease prevented. 8. That there is sufficient evidence to prove that such control and restriction, though surrounded with difficulties, are yet possible, and that the advantages to be derived from them are definite and highly important.

The consideration of the treatment of syphilis in the individual may by divided into (1) prophylactic, (2) abortive, (3) constitutional—*a*, of early syphilis; *b*, of late syphilis; *c*, of hereditary syphilis; and (4) local.

PROPHYLACTIC TREATMENT.

Circumcision in persons with long or tight foreskins, the use of covers, the avoidance of sexual intercourse during the presence of abrasions of the genitals, the use of protective or of antiseptic ointments, preliminary ablutions with antiseptic liquids by both parties, repeated immediately after the act, are measures which would obviously tend to diminish the risk of contagion. The risks of extragenital infection are lessened by the avoidance of close or prolonged contact of other portions of the body during the sexual act; and by great care in the use, without thorough cleansing, of drinking utensils, forks, spoons, and knives, pipes or cigar-holders, or other articles of personal use after they have been employed by others.

Chastity, the self-evident means of preventing the venereal forms of syphilis, belongs, as a method of prophylaxis, to the domain of morals; and while its discouragement by the physician is inexcusable, it can scarcely be held that he should deny those who decline to observe it as a rule of life the benefit of scientific advice, which may prevent the spread of disease not only to the individual who deliberately takes the risk, but to many innocent persons. As a rule of practice, it may perhaps be said that while such advice should rarely or never be suggested by the practitioner, it should not, on the other hand, be invariably refused. So much depends on the personal equation, as regards both physician and patient, that broad generalization is impossible.

ABORTIVE TREATMENT.

As has been stated, the essential nature of syphilis has not as yet been definitely determined. It seems probable, in the light of modern pathology, that it will be found to depend upon a specific microbe, but that microbe has not yet been isolated or cultivated, or distinctly demonstrated in any way, either clinically, experimentally, or microscopically. The treatment of syphilis can not therefore be based scientifically upon anything but clinical experience. Such experience, however, points so unequivocally to the employment of some form of mercury throughout almost the entire course of the disease, that as regards this main point there are practically no differences of opinion among living syphilographers. Whether we assume that syphilis has to be classed with the exanthemata as a specific eruptive fever, in which case the mercurial may be regarded as a specific antidote to the syphilitic virus; or believe that the phenomena of the disease are due to the entrance into the economy and the multiplication therein of a certain protoplasmic mass—the so-called syphilitic cell—in which case the effects of the drug may be attributed to its action in promoting destructive metamorphosis; or whether, confessing ignorance, we simply appeal to the history of the therapeutics of syphilis and select the drug which we know to have been of the greatest value, we are equally led to employ some form of mercury.

There are still a few physicians who believe in the *expectant* treatment of syphilis, or at least think that treatment is needful only in exceptional cases. Fournier (Journal de Méd. et Chir. Pratique, Dec. 10, 1891) has shown, however, that after treatment the graver cerebral and osseous lesions are never found in such proportions as where treatment has been neglected. On the other hand, one third of the cases of cerebral syphilis have been preceded by a benign second stage. The deductions from these facts are that no warrant for a favorable prognosis is afforded by even the most benign and mild secondary stage, and therefore that even the mildest forms of syphilis should always be thoroughly treated. In all probability those grave manifestations which are occasionally seen in cases where absolutely no previous history of syphilis is to be found are the results of neglect of initial symptoms which on account of their benignity have escaped notice.

Proper Period for beginning General Treatment.—When we approach the subject of the proper period at which to begin treatment we meet at once with a wide divergence of opinion. Mr. Jonathan

Hutchinson, unquestionably one of the ablest of living syphilographers, has recently reiterated the views which he long ago expressed regarding the early administration of mercury in syphilis, claiming that by the prompt employment of the drug in cases of chancre, and its subsequent continuous use, the secondary stage of the disease may be suppressed or rendered "abortive." His general propositions will undoubtedly meet with universal acceptance. When he states that in cases in which the induration of the sore is well characterized and considerable, it always yields quickly and definitely to the influence of mercury; that we never see sores remain typically hard while the patient is under that influence; that in cases in which high temperatures have been observed in syphilis they always promptly subsided under the use of mercury; and that when the patient receives no treatment until his eruption is well out, mercurial medication will usually, in the most definite manner, cause the eruption to disappear, every one having experience in the treatment of this disease must agree with him. The probable truth of the view which he has always so warmly advocated, that syphilis is due to a specific particulate virus, or, in the language of to-day, to a living microbe, and that therefore it is quite within reason to speak of the "specific" or "antidotal" action of mercury, will also be generally admitted. But when we come to consider his advocacy of the administration of mercury immediately upon the appearance of induration in the chancre, we meet with a serious practical difficulty, which, it seems to me, Mr. Hutchinson hardly estimates at its full value. There is a widespread belief among syphilographers that while there is a strong probability that an indurated sore will prove infecting, and that a soft, suppurating sore will not, there are exceptions to both these rules, and that "there is really no absolute proof of the infecting nature of any given sore, but the fact of infection itself." Mr. Hutchinson, it is true, says that ever since the recognition of the facts that some chancres are not infecting, and that the phenomenon of induration is the most valuable one by which to diagnosticate the true chancre, we have been in the habit of waiting until the character of the sore declares itself before beginning to use the specific, and adds that many, and especially those of the French school, have advocated delay until constitutional symptoms in the form of eruption appear, but with this remark apparently dismisses this aspect of the subject.

I have always regarded his work and teachings with such admiration and respect that I have been led once more to consider the matter carefully, having for years taught and practiced on the theory above mentioned, namely, that, all things considered, it was wisest to postpone the use of mercury until there was evidence of constitutional infection. Every surgeon whose work has brought him in contact with large numbers of cases of venereal sores must recognize the fact, rather unaccountably ignored by Mr. Hutchinson but unquestionably familiar to him, that between the typical soft suppurating local sore and the distinctly indurated chancre there are large numbers of doubtful ulcers which partake of the characteristics of both; local sores with deceptive inflammatory hardening and true chancres with equally deceptive inflammatory softening, suppuration, and even loss of substance.

Nearly every specialist who has written upon the subject has been influenced by this well-known fact. Mauriac, in his excellent paper on the diagnosis of chancre, after describing the cartilaginous, elastic, sharply circumscribed resistance met with at the base of a true chancre, says that when we find it we may "suspect very strongly that we are dealing with a syphilitic growth, although even those symptoms can not be considered as infallible." Diday prefers to wait until secondary symptoms make their appearance before instituting mercurial medication, believing, with Zeissl and Sigmund, that the subsequent course of the case is either uninfluenced, or is actually rendered milder by this delay. Keyes says: "General treatment should be commenced as soon as the diagnosis of syphilis is positive. To be positive on such an important point requires more evidence than is furnished by the simple physical characters of the sore, be they ever so positive. Diagnosis sufficiently accurate to commence treatment upon can only be made by confrontation—establishing the syphilitic disease in the person from whom the chancre was derived—or by waiting until some positive corroborative signs of secondary lesions appear."

Fournier, perhaps the most eminent living syphilographer, has recorded a case which bears most strongly upon the question under consideration:

> A female child, six years old, was said to have been infected with syphilis during an attempt at rape. She had marked vulvitis, and upon the labia three grayish, shallow, indurated ulcers covered with a diphtheritic-looking membrane, and raised a little above the general surface. In both groins there were enlarged, multiple, lymphatic glands. Fournier positively diagnosticated chancre, but, conforming to his custom in medico-legal cases, declined to testify for a few days. During this time, under a simple dressing, the symptoms disappeared, and the patient, who was carefully observed for several months, never showed any subsequent signs of infection.

Fournier believes that the case demonstrates that small inflammatory lesions may so closely resemble chancres as to deceive the most experienced surgeon, and adds that in medico-legal cases the diagnosis should not be made upon the local lesions alone, but should depend upon the development of constitutional symptoms.

Feulard (Bull. Soc. franç. de Dermat. et Syph., Paris, 1892, iii, 16–22) has reported a case of syphilitic ecthyma situated on the penis of a child fifteen months of age and having all the characteristics of a hard chancre, the parents displaying undoubted specific lesions.*

It would be easy to multiply evidence to this same effect, and I could from my own case-books give many examples of cases in which, if compelled to express an opinion, based upon the appearance at a given time of the local sore, I should have made the diagnosis of syphilis, although delay has, fortunately for the patients, demonstrated the innocent character of their troubles. Mr. Hutchinson, to be sure, says with characteristic candor that he must admit that the gross total of cases of primary syphilis which has been under his care has not been so much as that which falls to the share of specialists, particularly those holding hospital appointments, and that more patients come to him in the secondary stage than in the primary. This probably accounts for his somewhat too sweeping recommendation as to the early employment of mercury.

The surgeon who is daily called upon to give an opinion in cases which involve the whole future of the individual, his relations to the other sex, his determination toward celibacy or matrimony, his matrimonial relations if he should be already married, the question of the influence of paternity, the institution of a course of treatment extending over years, the diagnosis of any obscure visceral troubles which he may develop later in life, the profoundly depressing mental effect which a knowledge of syphilitic infection usually has upon intelligent people—the surgeon, I say, who remembers these facts and recalls the views which I have above cited as to the possibility of error, should surely hesitate about beginning a course of treatment which will possibly obscure or render altogether impossible the diagnosis.

Mauriac, in claiming that the reason urged by those opposed to the early or abortive treatment—i. e., that it prevents the appearance of secondary symptoms—is rather a reason for its early use, fails to appreciate the point of their argument. That such an abortive treatment is possible in certain cases, at least so far as outward symptoms are concerned, is probable; but until the cause, specific or bacteriological, is demonstrated, and a certain method of differential diagnosis is established to distinguish the primary lesions from all other similar sores, it must still remain sound practice to delay treatment until absolute proof is present.

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* Thiery recommends that for the diagnosis of doubtful venereal sores a scraping from the surface of the sore be gently taken with a blunt knife and placed between two cover-slips. Each of these should be rapidly dried over a spirit lamp, allowed to remain for two or three minutes in a solution of eosine, and then passed for half a minute into forty per cent caustic potash solution, washed with distilled water, dried with blotting paper, and mounted in glycerin under a magnifying power of from 300 to 400 diameters.

The discharge from a herpetic or from an infecting sore contains no elastic fibers, whereas that from a soft sore does. This examination, the author says, will often confirm and sometimes correct the diagnosis of the nature of a sore, but it must not be absolutely relied on.

He gives tabular results of his method applied in seventy-two cases (Le Prog. Méd., January, 1889). I have not heard that these results have been corroborated.

While I am not disposed in the least to agree with those who believe there is positive advantage in this delay as regards the subsequent course of the case, yet I do not think, on the other hand, that the gain from the immediate treatment during the primary sore is sufficient to counterbalance the doubt and uncertainty which that treatment often throws about the future life of the patient. It has been my custom to advise my pupils never to begin constitutional treatment for syphilis unless they were prepared to demonstrate that the disease existed; and certainly the cases are frequent in which a careful surgeon would be unwilling to take this position during the existence of the primary sore alone. There are a few necessary exceptions to this rule, which may be included under the following heads:

1. Where confrontation is possible, and the sore is distinctly a typical one. 2. Where, with a similar sore, its continued existence would destroy or imperil the conjugal relations of two people or possibly the happiness of an entire family. 3. Sores with characteristic induration, but with marked tendency to spread and involve important regions. 4. Sores in such conspicuous positions, as upon the lips or the nose, that their continuance would involve a general knowledge of the patient's condition. 5. Sores in such positions, as on the finger of a surgeon or an obstetrician, as may lead to the infection of others. 6. In cases of infection of women during pregnancy.

With these exceptions I still believe, in spite of Mr. Hutchinson's teachings to the contrary, that it is the part of wisdom to wait until the development of glandular enlargement at some point removed from the initial lesion, and not, therefore, by any possibility a result of simple adenitis, demonstrates the constitutional character of the trouble. It is not necessary to wait for the syphilodermata. Treatment may be safely begun when, after a suspicious sore upon the genitals, consecutive enlargement of the epitrochlear or post-cervical lymphatics takes place, and, beginning at this stage, I can cordially indorse all that Mr. Hutchinson claims for a continuous mercurial treatment as to its effects in suppressing or "aborting" subsequent symptoms.

This opinion in regard to the period at which we should begin treatment is supported by Fournier, Neumann, Kaposi, Neisser, Unna, Köbner, Zeissl, Diday, Sigmund, and many others; while, in addition to Hutchinson, Mauriac, Jullien, Schwimmer, and Watrazewsky are among the foremost of those believing in the early or abortive treatment.

Local Abortive Treatment.—The arguments which I have used as against the mercurial treatment of chancre apply with equal force to the local abortive measures which have from time to time been recommended. These include cauterization, excision, antiseptic measures, and various local applications of mercurial preparations by means of ointments, hypodermatic injections, or otherwise. Taking them in the order mentioned, their relative advantages and disadvantages seem to me to be as follows:

As to *cauterization*, it appears to me unquestionable that it can be of service in but a very small proportion of venereal sores as they usually come under the notice of the practitioner. The publication of certain cases—such as the well-known one of Mr. Hill, who cauterized the torn frænum within twelve hours after the accident, and in whose patient syphilis developed at the usual time; and that of Clerc, in proof of the uselessness of immediate ablution—has had a marked effect in influencing professional opinion upon this matter. The teachings of Ricord and Sigmund, who believed that cauterization within five days after contagion certainly prevented infection, have long since been shown to be misleading, as in those days local sores were not clearly differentiated from infecting chancres.

Sores which appear within five days after intercourse are rarely or never syphilitic, and this fact at once throws out ninety per cent of Ricord's and Sigmund's alleged successful cases. In the remainder, in which cauterization was immediately applied, as in Mr. Hill's case, to a tear or abrasion during coitus with a person known to be syphilitic, there is, of course, no certainty that the disease would have developed even if local treatment had been adopted. The opinions of syphilographers vary greatly in regard to the value of this form of treatment. Keyes peremptorily rejects it as useless and unphilosophical, with the remark that no amount of cauterization nor any local treatment can prevent the development of general syphilis after the poison has once been absorbed, much less after the chancre has appeared. Hill and Cooper think it wiser to assume that we can not indicate any period at which syphilis is a local disease which can be extirpated by local treatment. Bumstead and Taylor believe that chancre is never a mere local lesion. On the other hand, Mr. Hutchinson finds it difficult to believe that absorption of syphilitic virus is so rapid that there is no stage during which it remains limited to the seat of inoculation, and prefers to act as if this stage comprises the first week or ten days after contagion.

Excision of the Chancre.—Jullien remarks that, in spite of theoretical considerations as to the rapidity of absorption of the virus of syphilis, or of other contagious diseases, he still thinks we have no right to neglect whatever small chance may be offered by the employment of cauterization or excision whenever the sore is seen during the first three days. Within the past ten years he has excised eighteen chancres. In only fifteen cases, however, were the patients under observation for a sufficient length of time. Of these, three remained free from syphilis, the other twelve having a mild form of the disease. In two cases there were multiple chancres following the excision, which fact, Jullien believes, shows the efficacy of the excision by the absence of a protective infection of the system. One patient who remained free from symptoms for seventeen months, contracted another sore at that time; there was no excision of this second sore, and syphilis followed.

Cornil says that we are not in possession of absolutely conclusive evidence upon this point, but that it is highly probable that the syphilitic virus inserted under the skin remains there a certain length of time without any other action than gradually to change the cells which are in immediate relation with it, and slowly to prepare them for the hyperplasia which soon constitutes the chancre. Auspitz, Unna, and Kölliker believe that the initial indurated sore is not to be considered as a symptom of general infection. The experience of the latter authors in the excision of chancres has encouraged them to believe that, in a small proportion of cases, general contagion may in this way be prevented.

Ehlers (Tenth Internat. Med. Congress, Berlin, 1890) believes that excision lessens the severity of subsequent symptoms, their intensity being proportional to the amount of infection. He gives the following statistics, based on five hundred and eighty-four reported cases and thirty-seven observations: In cases where excision was used there were ten per cent of abortive cases, eighty per cent much modified, and in only ten per cent did severe symptoms appear. From this he concludes that excision is useful both in preventing general infection and in modifying the course of the disease. He advises mercurial treatment in conjunction, whether secondary symptoms appear or not. He also cites two cases in which a second inoculation followed excision.

It is to be noted that in the discussion following Ehlers's paper all the speakers, with the exception of Neumann, believed in the theoretical possibility of either aborting syphilis or rendering its course milder by excision of the chancre.

Fournier believes that excision gives an average of one success in five cases, and that it should be employed—1. When by confrontation the syphilitic origin of the lesion can be demonstrated. 2. When the period of primary incubation has been from twenty-four to twenty-eight days. 3. When the evidence renders it impossible to confound the sore with herpes, soft chancre, folliculitis, or ulcerating or chancriform syphilides. To make the case of any scientific value, the patient should remain under surveillance for a prolonged period of time, without mercury or the iodides.

Among those opposed to excision there exists a considerable amount of doubt, in regard to the trustworthiness of the reports of the cases operated upon. Renault voices this doubt when he says that he believes that "not a single report of excision is valuable as far as the *proof* of its usefulness is concerned"—basing this opinion on the inability of the observers to diagnose the initial sore from many others; he believes the uncertainty is worse for the patient than the disease.

Familiar with these opposing views, and striving to find a safe general rule for practice and teaching, I have for a long time thought it best to assume that a sore seen within a few days after its appearance, and as yet unaccompanied by any enlargement of the inguinal glands, was still a localized lesion. If favorably situated—i. e., upon the skin of the prepuce or of the genitals—I have advised its removal by excision, and in a large number of cases have practiced it, picking up the sore and surrounding tissue with a pair of toothed forceps, and removing it by a single sweep of the knife, or by means of scissors curved on the flat, afterward dressing the wound with iodoform or boracic powder. When the patient refused this treatment, or when the sore was so situated that its removal would cause considerable pain, hæmorrhage, or deformity, I have employed destructive cauterization with fuming nitric acid.

As regards protection from subsequent constitutional disease, my results have, on the whole, been unsatisfactory; but in a few cases—seven, all told—I have succeeded in making my observations under unusually favorable circumstances. In these cases the patients came to me promptly upon the development of the sore, and sent to me, for examination, the woman with whom they had had connection; evidence of syphilis being discovered in the latter, I excised the sores of the male patients, and cauterized the resulting wound with nitric acid. In three of these cases, microscopical examination by my friend Dr. Simes showed that the sores possessed the usual characteristics of hard chancres. In one of them slight glandular involvement had already shown itself; in the others it had not yet appeared. The shortest period intervening between the appearance of the sore and my inspection of it was twenty-four hours, the longest five days. In three of the seven cases, including the one in which there was slight glandular involvement, no further symptoms have ever developed; in the remaining four the appearance of constitutional symptoms was delayed from three to five weeks beyond the usual time, just as is the case from the mercurial treatment of chancre.

It is only fair to add that, during the time I have been making these observations, I have had several cases in which excision was not performed, on account of the anatomical seat of the sore, which I yet believed to be almost certainly specific, but which healed, and disappeared without the development of the slightest constitutional trouble. In these latter cases, however, I had no opportunity for confirming my diagnosis by confrontation. In all cases (and these comprise the majority which come for treatment) in which a week or more has elapsed since the development of the sore, and in which involvement of the dorsal lymphatics of the penis and the inguinal lymphatic glands is observable, I reject cauterization as a routine method of treatment, on account of its undoubted uselessness at that stage in preventing constitutional disease; the pain which it causes; the inflammatory action which follows it, and which often produces enough œdema and swelling to cause phimosis and thus convert an open sore into a hidden one; the subsequent effusion of lymph, which simulates true induration and confuses the diagnosis; and, finally, the greater liability to the production of suppurative action in the ordinarily indolent bubo of syphilis.

It seems to me that by following these rules I have given my patients whatever small chance there may be of avoiding constitutional disease, while at the same time exposing them to the minimum degree of local pain and disturbance.

The so-called *antiseptic treatment* of the initial lesion of syphilis seems to me a misnomer, so far as the essential character of the sore is concerned, unless it be meant to include only the thoroughly destructive cauterization of all portions of the infected tissue. Applied simply to superficial dressings placed over the chancre, it can refer only to the prevention of the development of pyogenic organisms upon the surface of the sore. As the tendency of infecting chancres to suppuration is usually very slight, and their local significance is generally unimportant, we can hardly look here for advantages from the employment of aseptic or antiseptic methods which are at all commensurate with those obtained by the same measures in ordinary surgical conditions.

The method recently recommended by Bronson, the local treatment by *hypodermatic injection of mercurials* beneath the base of the initial lesion and into the mass of the indurated lymphatic glands, is based almost exclusively on theoretical grounds. It appears to rest upon the view that mercury acts as an antidote when brought directly into contact with the syphilitic germs, and that this influence would probably be especially active if the drug were brought to bear directly upon the local lesions which are the foci of infection during primary syphilis. If we believe that the virus remains localized for a time after inoculation and is not disseminated through the general system, and that mercury acts by its germicidal influence, this treatment is not unphilosophical, but seems manifestly inferior to the more thorough plan of excising both the chancre and the enlarged lymphatics of the groin. The latter procedure would perhaps be less likely to result in local troubles, such as abscess or cellulitis, and would certainly be more effective.

Neisser (Deutsche med. Woch., Jan. 3 and 10, 1884), after observing that failures after excision were so numerous that it was practically abandoned, says: "It is only recently that the old-time theory and practice have been reverted to, as in full accordance with the bacterial notion of syphilis, and now we direct our efforts to the extirpation of the primary sore, in the hope of thus preventing, at a single stroke, the extension of the mischief. That is, we regard the initial induration as simply the local focus of infection, as the center in which the syphilitic virus is developed and from which it spreads, and consequently as the chief if not the only source of general contamination." He suggests that, reasoning from theory if not from practice, the progress of the disease may be rendered milder by excision of the sore, in cases where it is not prevented. For similar reasons he is strongly in favor of extirpating the lymphatic glands first involved.

If Finger's assertion be correct, and if the innocuity in the primary stage be due to tissue products of the virus in the circulation, the infected foci being still strictly localized; and if, further, the severity of the syphilis has any relation, as he claims, to the dosage of the virus (see p. 709), excision of the primary lesion becomes not only a warrantable but a logical and proper proceeding. Some years ago, basing my opinions simply on clinical experience, I said (Cornil on Syphilis, American edition, p. 106) that the evidence in favor of excision was sufficiently conclusive to warrant its adoption in most instances. In the new light which bacteriology is throwing upon this disease in all its stages, there would seem to be more reason than ever before to adopt excision as a routine practice whenever the situation of the sore admits of it.

My views upon the general subject of the abortive treatment of syphilis may be expressed as follows:

I. While it is unquestionably desirable to begin mercurial treatment at the earliest proper moment, while that treatment undoubtedly either suppresses or renders milder the subsequent secondary manifestations, and while there is every reason to believe that in this way the liability to later or tertiary lesions is somewhat lessened, nevertheless the sum total of these advantages does not warrant the employment of mercury one moment before the diagnosis of constitutional disease is absolutely assured.

II. While in many cases that diagnosis can be made with a high degree of probability from the appearance of the primary sore alone, yet it can not be said that all possibility of error is excluded until some general symptom, such as the enlargement of distant lymphatic glands, has shown itself.

III. The administration of mercury during the existence of the primary sore, unaccompanied by general symptoms, for the purpose of suppressing or "aborting" syphilis, is not therefore justifiable, unless by confrontation the diagnosis can be confirmed, or unless there are urgent and unquestionable reasons for securing rapid cicatrization of the chancre.

IV. It is proper to employ cauterization or excision according to the site of the chancre, in cases in which it is seen very soon after its appearance, and especially when it is known to have followed intercourse with a syphilitic person. The chances of preventing constitutional infection in this way, while slight, may yet be considered sufficient in such cases to counterbalance the disadvantages of the method, such as pain, swelling, the production of phimosis or of suppurating bubo, and the obscuring of the diagnosis by the resulting inflammatory exudation.

V. Aseptic or antiseptic measures, while harmless, can not be considered especially indicated in the local treatment of chancre, and can in all probability have no true abortive influence.

VI. The local use of mercurials, hypodermatically or by inunctions, is perhaps worth a trial, but it is probably inferior to the more radical methods based essentially upon the same principles, namely, excision and cauterization.

CONSTITUTIONAL TREATMENT.

History.—For nearly four centuries mercury has, for one or another of the reasons already stated (p. 715), been the drug chiefly employed in the treatment of syphilis. Of these theories that which seems the best supported by modern research is the one that attributes its good effects to an antidotal or bactericidal action. Corroborative evidence is afforded by the experiment of Boeck, who says that if we add to a drop of virulently infectious syphilitic pus one drop of a 1 to 1,000 sublimate solution, this mixture injected beneath the skin is devoid of all infectious quality. During the period immediately following its introduction by Cumanus (1495) its use by means of inunction, fumigation, and baths was attended with consequences often worse than the disease itself, the large doses thus given leading to salivation, profound cachexia, serious paralysis, etc. Cornil (American edition, translated by Simes and White, p. 432) has well summarized the subsequent history of its employment in syphilis: The toxic effects arising from the abuse of mercury were so grave that the introduction of guaiacum and of the sudorifics, which were advanced as sovereign remedies in the cure of syphilis, was hailed as a deliverance. From this time the physicians divided themselves into mercurialists (Vigo, Fracastor, Massa, Botal, and Rondelet) and antimercurialists (Torella, Fernel, Fallope, etc.). Shortly afterward mercury was used internally, at times in the form of the red oxide, at others as the deutoxide, or in pills of metallic mercury—the latter form, according to accounts of the times, being taken by Francis I. The employment of mercury was still, however, nearly always pushed to the production of salivation.

Nevertheless, at the commencement of the eighteenth century, Chicoyneau, and the school of Montpellier, substituted for salivation—now considered useless—more moderate doses with a prolonged course of medication, and called it the "method of elimination." In our time, Broussais and his followers, Deruelles, Devergie the elder, and others, considering syphilis as a collection of nonspecific inflammatory lesions, treated it by bleeding and by attention to the diet.

Fergusson, Thompson, and others, in England, also treated their patients without mercury, and it is necessary to count among the antimercurialists the partisans of syphilization, Auzias-Turenne and Sperino, who, seeking a sort of vaccination for syphilis, believed they could cure it, and place a patient beyond the reach of its poison by inoculating him with the pus from a simple chancre. The recognition of the dualism of chancroid and syphilis has terminated these attempts.

Murphy (1839), in England, Joseph Hermann (1855), and Lorimer, in Vienna, endeavored to show that mercury was the sole cause of the secondary and tertiary phenomena of syphilis. Kletzinsky having proved that the use of iodide of potassium tended to eliminate mercury from the system, Melsens argued from this that iodide of potassium acts in the third stage of syphilis merely because it drives out the mercury, the cause of all the evil. Kussmaul (1866) and Virchow, by a long study of the histological effects on the one hand of mercurialism, and on the other of constitutional syphilis, had no difficulty in proving that there is no analogy between these phenomena.

At the present time the number of antimercurialists is very small, M. Despres having been recently the only representative of this doctrine in France. He regarded, and with some reason, the tertiary productions, especially the gummata, as traces of chronic inflammations, similar to those resulting from purulent infection, and denied that they possess any specific quality. According to him, syphilis should not be obstructed in its onward course any more than an eruptive fever should, and he confined his treatment to the giving of tonics to sustain the strength of his patients.

Hutchinson (The Modern Treatment of Syphilis, The Practitioner, June, 1891, p. 403) says: "Excepting in Edinburgh, I believe there are at present in the profession scarcely any antimercurialists left, and I may remark, in passing, that during the last few years some of the most severe cases of syphilis that I have seen have come from Edinburgh, and have been treated in the early stages by systematic abstinence from mercury."

Taylor says (Hare's System of Therapeutics, vol. iii, p. 38), "I know of no antimercurialists in America." I believe that as regards syphilographers this is true. There are, however, a great many practical antimercurialists among the general practitioners, who, yielding to the prejudices of patients or timid in the use of the drug, give it in quantities so small and for periods so short that for all useful purposes it might as well not be given at all.

Although the ultra-antimercurialists have nearly disappeared, many of the syphilographers (Diday, Lancereaux, Jullien) do not give mercury in every case, and can thus be classed with the moderate mercurialists in comparison with Fournier, who invariably employs this drug, and continues its use after all phenomena have disappeared.

To the latter class belong also Hutchinson and the leading syphilographers of Great Britain, Germany, and America.

Diday, to be sure, believes syphilis to be a self-limited disease, and thinks that with proper regard to hygiene and nutrition patients recover as quickly as when under specific treatment, and are no more liable to relapses. It may, however, be considered as a well-established fact that, without detriment to health, the chances of a successful cure can be increased and its approach hastened by the careful use of some form of mercury. According to Fournier (see p. 715), grave cerebral and osseous lesions are not so frequently found in cases treated by mercurials as when hygienic treatment alone is employed. There is, for example, no warrant for giving a favorable prognosis after a benign and mild secondary stage, as one third of the cases of cerebral syphilis have been preceded by such a mild form, and even mild cases should therefore receive thorough treatment.

But when we have decided for the above reasons to administer mercury as a routine practice to all or nearly all our syphilitic patients, and have concluded (p. 724) that it is wise in the majority of cases not to begin its exhibition until the development of an unmistakable constitutional symptom, there will still remain some important questions to determine:

1. Shall it be given only as symptoms demand it?
2. Shall it be given continuously over long periods?
3. Shall it be given interruptedly in periods of varying length with intervals of complete rest from medication?

These are the main questions that are under discussion. Each of these plans has its advocates, and each of the latter two has its merits. They may be considered in the order of mention.

1. The Modified "Expectant" Plan of Treatment.—This is supported more or less fully by Diday, Lancereaux in France, and by the two Zeissls in Germany, but has in my judgment little or nothing to commend it. That in a disease almost certainly due to microbic infection, with the knowledge that the tissue changes produced in it are widespread and often permanent, and that there is good ground for believing that in this, as in all such diseases, the gravity and extent of these changes depend largely on the relation between the "dose" of the micro-organism and the resisting power of the normal cells, we should avoid the use of a drug whose antidotal or germicidal power has been so abundantly proved, except when gross superficial lesions obtrude themselves upon our notice, is to my mind most unphilosophical. Nothing whatever that has been written in support of this plan—and much eloquence has been expended upon the subject—is worthy of serious consideration in the face of such observations as those of Fournier already quoted (pp. 715, 727), and the accumulated clinical experience of the profession. As Taylor says (*op. cit.*, p. 41): "If any one wishes to get a good idea of the expectant or opportunistic system of treating syphilis, let him study the disease in dispensaries, clinics, and hospitals. Patients who are treated in these institutions, as a rule, do not apply until more or less urgent manifestations and symptoms begin to trouble them. In general, they merely get patched up, for they only remain as long as their immediate trouble is present and urgent. Then off they go, to return later on with new and perhaps worse manifestations, no medicine having been taken in the meantime. Then, again, let any man who sees in his practice many cases of syphilis watch those who follow treatment regularly and carefully, and compare their condition with that of patients who are careless and only apply for relief in times of urgency, and he will find that the *laisser-aller* cases are the ones which, as a rule, do badly."

2. **The Continuous Treatment of Syphilis.**—As a routine method this varies in its details according to the drug employed and to the method of ingestion.

It may be considered here as described by two of its principal advocates, and in their own words:

(*a*) Mr. Hutchinson, who, as long ago as 1874, emphasized the importance of thorough and long-continued courses of mercurials in his most recent publication (Syphilis—Clinical Manual, 1890, p. 51), says:

> One simple rule appears to be the key to success. It is, to give small doses more or less frequently repeated, and never large ones. . . .
>
> Hydrargyrum cum creta is perhaps the most constant and least variable of all preparations. It may be made into pills of one grain, in combination with one grain of Dover's powder if necessary, and of these the patient may take one every six, four, three, or even two hours, according to circumstances. Usually, one pill four times a day will suffice to clear away a chancre or a secondary eruption as rapidly and as completely as can be wished. In some cases it may be more convenient to double the dose than to increase the frequency of administration; but the latter, if the patient is willing, is the better plan. If ptyalism should occur with such doses, it will certainly be mild and easily controlled. As a rule, however, all the symptoms of syphilis may be got rid of without any affection of the gums. If such affection should occur, it usually implies the full physiological influence of the drug, and a very rapid subsidence of symptoms may be simultaneously expected.

(*b*) Keyes, who has formulated a working rule which has been widely followed in this country, says:

> The same drug should be used continuously if possible. It may be changed occasionally for a time to meet an emergency—i. e., when, in spite of the tonic dose, as is often the case, there suddenly occurs an outcrop of fresh symptoms. Now, instead of using the "full dose," some other more active means may be employed, as bichloride internally or by injection, fumigation, inunction, etc., until the new symptom yields, after which it is well again to revert to the original drug and fall back upon the "tonic dose.". . .
>
> The standard fractional dose being selected, preferably in form of granules —one sixth grain of protiodide, one half grain blue mass, one thirtieth grain bichloride—it remains to find the "full dose" and the "tonic dose." No combination containing opium can be used in selecting a standard fractional dose. The diet and habit should be regulated, and the course commenced by causing the patient to take one granule of the standard preparation immediately after each meal for three days—that is, three a day. For the next three days he takes four a day (one in the morning, two at noon, and one at night); then, for three days, five a day (two in the morning, one at noon, and two at night); then, for three days, six a day (two in the morning, two at noon, and two at night); then, for three days, seven a day (two in the morning, three at noon, and two at night); then eight, and so on, adding one granule to the daily dose each fourth day—if there is reason for haste I make it each third day—until pernicious medicinal effects of mercury begin to show themselves, which are, with the protiodide, usually griping pains in the abdomen, and at least two free watery stools a day. An occasional pain I pay no attention to, and free movements of the bowels I do not regard so long as these movements are not watery. Mild colicky diarrhœa is what I wait for, and when this comes I write down the daily number of pills required to produce it, and name this number the "full dose." Such a dose may and usually does promptly control syphilitic symptoms, and it may be maintained, and its obvious objectionable features done away, with by giving the patient a certain number of half-grain granules of opium to take along with his protiodide. If blue pill, gray powder, or bichloride be used, the full dose may first announce itself by commencing irritation at the mouth before the intestines show disturbance. This full dose can not be maintained without injuring the patient, and it must only be used for a short time when required for emergencies.
>
> Half the full dose is the "tonic dose," and sometimes one third the full dose is all the patient requires to keep him moderately free from symptoms, which is all he can ask.
>
> If, when the patient is first seen, his symptoms are so severe that he can not wait to find his dosage by this method, he may be more actively treated by bichloride, by fumigation, or inunction, until his active symptoms are over, and then, after a rest, his full dose may be sought in the manner above described and his tonic dose obtained.
>
> Few patients can take more than twelve granules a day for their full dose, and more stop at nine. I have known a patient go to twenty. If a patient can not take three a day I consider him unfit for treatment, by the protiodide. The size of the "full dose" varies greatly for different individuals.
>
> The patient is not to be kept at his full dose. If he has active symptoms he

may be kept at three quarters of the full dose, or the latter may be maintained by opium until the emergency is over. If the symptoms are not active, a rest should be given for several days until the ill effects of the mercury have entirely subsided, and then the "tonic dose" may be commenced with the idea of continuing it daily, month after month, for an average of about two and a half years. Under this dose—one half or one third of the "full dose"—the patient will often, but of course not always, enjoy better health than he did before he got his chancre—that is, he will eat, drink, sleep, and work with greater satisfaction to himself. True, he will have occasional drawbacks in the form of mouth-spots and of out-cropping syphilitic symptoms, and these must be met by appropriate local means, or by temporarily putting in a portion or even the whole of the "reserve dose" to constitute the "full dose," protected by opium until the flurry is over.

I have given these views in the exact language of the authors, and very fully, both because they represent the essentials of the continuous system of treatment and because they form the basis of the method which I prefer and shall presently describe.

3. **The Interrupted Treatment of Syphilis.**—(*a*) This method has for its most distinguished advocate Fournier, whose views have, however, undergone considerable modification since they were first announced in 1872. He then limited the period of treatment to two years. He began by the administration of from three quarters of a grain to one and a half grain of the protiodide daily in divided doses (Taylor, *op. cit.*, Annual Univ. Med. Sci., 1891, F. 34). He kept this up for two months, and then, no matter whether symptoms were present or not, he suspended treatment, on the theory that his patient had by that time become accustomed to the mercury and that continued doses would have only a relatively small effect. He then, in any event—i. e., either in the presence or absence of symptoms—began treatment again and continued it for from six weeks to two months. An interval of three months without treatment followed, to be succeeded by a mercurial course of from six to eight weeks, and that again by another interval, so that at the expiration of two years the ratio of the period of treatment to the period of intermission was about as 10 to 14. As Taylor says (*op. cit.*, p. 48): "It evidently has not fulfilled the expectation of its originator. for we find that within a few years Fournier writes, 'Syphilis is an infectious chronic constitutional disease, diathetic like gout and scrofula, and should have a lifelong treatment.' So in 1889 he says that in the third year there should be four courses of six weeks each, with respites of equal length, and that iodide of potassium should be taken; in the fourth year four similar courses of six weeks' duration, and in the fifth year three courses."

It seems possible that the most convincing argument as to the inefficacy of Fournier's original plan is to be found in this very change of method, as the lengthening of the period of treatment to make it run through life is apparently evidence that the intermittent course has frequently failed to produce permanent cures.

(*b*) Taylor vigorously advocates a course of treatment consisting of the administration of about one third of a grain of the protiodide of mercury three times daily, the aim being to keep up a continuous mercurial action during from four to six months after the onset of the secondary stage. He adds:

> In general, this can be done without any serious drawbacks if the case be properly watched. There may be periods of a few days in which it is necessary to suspend medicine and either leave the stomach at rest or give tonics. But, as a rule, this early period offers us our golden opportunity, and we should always avail ourselves of the then existing favorable condition of the stomach and the system to assimilate mercury. In somewhat rare cases mercury taken by the stomach acts as a general depressant and the patient's nutrition is impaired. I have many times seen these grave drawbacks and seeming contradictions promptly dispelled by the employment of hypodermic injections of the bichloride of mercury. In such cases it is well to begin with a moderate dose and then work upward as fast as we can.
>
> During this initial, active, and energetic course we must take special care of the patient's nutrition, and be watchful of his well-being. If possible, change of air and scene at the seaside or the mountains should be enjoyed, and as much recreation indulged in as possible. The lighter the patient's cares and the less burdensome his condition of life the more auspicious will his progress toward cure be.
>
> While a patient is undergoing this mercurial course he should have one or two warm baths each week on going to bed, in order to produce diaphoresis. When practicable he should take Turkish baths without the cold plunge, and after them should be made to sweat freely At the seaside cold salt-water baths are very beneficial, and an occasional hot sea-water bath, followed by packing and a sweat, is a valuable adjuvant to mercurial treatment.
>
> Having administered an efficient treatment, with few and short interruptions for about six months, it is safe to say that in most cases, particularly uncomplicated ones, the patient will be well on his way to recovery.
>
> If the condition of the patient is satisfactory, as shown by the absence of all lesions, by almost entire subsidence of the lymphatic ganglia, by a good condition of his nutrition and strength, and by the absence of symptoms pointing to nervous depression and debility, at the end of six months he may have a rest, the moral effect of which will be very salutary.
>
> Taylor then advises a month's cessation of medication, after which he either begins a systematic course of inunction, or puts the patient upon a combination of a full dose of mercury and a small dose of the iodide of potassium, which he keeps up, "with or without slight interruption, for three or four months, or even longer, if the patient shows no signs of deterioration of health referable to the treatment." During the first year the patient is under treatment for nine or ten months, during the second year for about eight months. He adds: In most cases, at the end of the second year of thorough treatment patients may be pronounced cured, provided they have not for many months shown evidence of the disease, that their lymphatic system appears healthy, and their general health and nutrition are good.

It may be well to mention the arguments used in favor of this latter plan of treatment—the intermittent plan.

Fournier, in 1872, gave as his reason for advocating the intermittent plan of treatment the so-called "tolerance" to mercury which was established after its continuous administration for long periods; and Taylor reiterates this, and exemplifies it in expressing his objections to the continuous plan of treatment. He says: "The continuous use of mercury by stomach ingestion induces a condition of tolerance, and after a time it ceases to be a therapeutic agent, or has no effect—certainly none that is beneficial"; and further asserts that the reason some patients who have been treated "continuously and without any intermission whatever" for two or more years still have lesions that refuse to disappear, is because "they have used mercury in a weak and impotent manner in the early days of syphilis, and have continued its use long after it had ceased to have any therapeutic effect—long after it had lost its influence, when given by stomach ingestion, over the syphilitic diathesis."

This seems to me like a pure assumption. It may be true, but it would be more to the point to say that, whatever quantity they may have been taking by the mouth, they were probably not absorbing a sufficient dose, rather than to assert that the drug had lost its influence over the syphilitic diathesis. The probability is that mercury does good in syphilis by its action upon the specific microbe of the disease, and it is opposed to all bacteriological reasoning, if we may argue from analogy, to suppose that any "tolerance" between the micro-organism and the drug could by any possibility be established. Taylor objects also to the exclusive use of any particular drug; but this does not bear upon the discussion as to the comparative merits of a continuous and an intermittent plan of treatment, nor does his further objection to the "arithmetical" element in the plan proposed by Keyes.

Systematic Treatment.—I have now had an experience in the treatment of syphilis which justifies a certain amount of confidence in my own opinion, having had for many years teaching and hospital positions bringing with them a large service in venereal diseases, and having, as a result, seen much of such disease in my private work. I mention these facts as an excuse for apparent dogmatism in the following statements.

I believe that the best plan of treatment is as follows: While waiting for the diagnosis of syphilis to be assured in a patient who has a suspicious sore, he should be sent to a competent dentist and should have his mouth and teeth put in the best possible condition. At the same time attention should be paid to his gastro-intestinal tract, his diet regulated, and any tendency to dyspepsia, to catarrhal diarrhœa, or to constipation noted and prescribed for. At the same time, also, the urine should be examined and the average daily quantity noted. These observations are not only of value in the future management of the case, but they serve to tide over that somewhat trying period when both the surgeon and the patient are in doubt as to the outcome. The latter feels that something is being done, that time is not being wasted, and has the not unwarranted satisfaction of thinking that he is being put in better condition to withstand the attacks of disease. As Neisser says, this period of delay is unpleasant on account of the suspense and apprehension which are unavoidable, but we must endure it and encourage our patients to do so until the time when the demonstration of the specific bacteria in the secretion of the chancre shall enable us to recognize the disease at once, and without waiting for the development of its characteristic symptoms. If, on the occasion of the first visit, a positive diagnosis can be made, it is still proper to examine the mouth, to send the patient to a dentist if necessary, and to regulate the diet.

Reasons have already been given for the selection of mercury as the drug with which to begin treatment. As to the particular preparation to be employed there is no necessity for laying down an inflexible rule. I have always thought that the protiodide was to be preferred for routine use, for the practical reason that it has stood very well the test of employment by hundreds of syphilographers in tens of thousands of cases, and has, on the whole, given good results. I have also felt that there might be some advantage in even the small amount of iodine which the salt contains. Syphilis is, from first to last, characterized by cell hyperplasia, and the indications are not only to destroy the micro-organism and favor fatty degeneration in the exudates caused by its presence, but also to stimulate the absorbents to remove the products of disintegration and retrograde metamorphosis. That the iodine of the protiodide does this to any appreciable extent there is no evidence with which I am familiar, but it is possible that it accounts for some of the good effects produced by this preparation.

The other mercurial salts which seem most worthy of mention as possibly to be preferred are the bichloride, and, on the great authority of Mr. Hutchinson, the "gray powder" (hydrargyrum cum creta). I have tried each of these faithfully, and in many cases. Either of them if given in sufficient doses will produce the speedy disappearance of specific symptoms; sometimes one or the other can be taken freely and pleasantly when the protiodide disagrees, and this is especially true of the mercury with chalk. Blue pill, which Hutchinson makes his second choice, and calomel, which is preferred by others, have in my experience been so unsatisfactory that I do not include them in the list of preparations from which the one for the routine treatment of syphilis is to be chosen.

I agree, however, with Mr. Hutchinson in the belief that simplicity of prescription is an advantage not to be despised in the busy life of a surgeon, and that there is a great deal of wear and tear to be saved by habitually prescribing the same remedy for the same disease. A still stronger argument leads me to recommend the selection of one or the other of the above drugs to the exclusion of all the rest in an average case; and that is, that a safe basis for comparison is soon established in the mind of the surgeon, and he is better able to estimate the obstinacy or inveteracy of a particular case, and thus can give a more accurate and useful prognosis, if he has observed the reaction of the patient and of his symptoms to a given drug in a large number of instances, than if he has employed a variety of preparations. This does not interfere with the treatment of the individual, with the withdrawal of any particular remedy in the presence of symptoms of disagreement, nor with the substitution of any other remedy that may seem indicated.

Indeed, it is probable that every syphilographer of experience, whatever may be his theoretical views on the subject, sooner or later settles down to the use of the tool with the workings of which he finds himself most familiar and best satisfied.

If the protiodide be selected, the patient may be given the following prescription:

℞ Hydrarg. iodid. viridis.	℈j
Confection. ros.	q. s.

M. et ft. pil. no. lx.

He should be told to take three pills on the first day, four on the second, five on the third, and so on, increasing the dose by one pill each day, and reporting for observation every second day. As the surgeon is endeavoring at this time to ascertain definitely the patient's susceptibility to the drug—i. e., to learn just what quantity of it will begin to produce its characteristic toxic effects—it is evident that some standard must be adopted, some characteristic symptoms sought for.

These symptoms should be really and unmistakably indicative of the full physiological or beginning poisonous effects of mercury. They should not therefore include those which may reveal only its local irritant properties, and may vary greatly with temporary conditions, as, for example, those of a mucous tract like that of the gastro-intestinal system, unavoidably subject to many disturbing influences. For that reason I believe the rule which makes a certain amount of intestinal colic or looseness of the bowels—"mild colicky diarrhœa" (see p. 729)—the gauge of the patient's susceptibility to mercury to be an unsafe guide in practice. Colic and diarrhœa show only the reaction of the mucous membrane of the stomach and intestines to the particular preparation of mercury which is being used. They may occur under a dose which is altogether inadequate to deal with the microbe or virus of the disease. They indicate defective absorption of the drug, and leave it open to question whether, when they have made their appearance, one half, one third, or some other fraction of the daily dose is being taken up and reaching the general circulation.

I think there can be no doubt that the object aimed at—i. e., the discovery of the susceptibility of the individual to mercurials—is an important and useful one. The therapeutics which eliminates personal peculiarities, idiosyncrasies, the varying reactions of normal tissues to the agents employed by the physician, is that of the days of Galen or Paracelsus. Acquaintance with the characteristics of different families and different members of the same family constitutes the great merit of the general practitioner, and often makes his advice of more value than that of the most distinguished specialist. In a disease in which treatment is to be conducted chiefly by means of one drug, and is to extend over years, it is so obviously sensible and philosophical to learn at the outset the patient's reaction to that drug, that it seems to me useless to argue at any length in defense of the principle.

But in applying it, if a faulty standard is adopted, the rule may lead to lamentably insufficient treatment and disastrous consequences.

I prefer, therefore, to regard the condition of the mouth and gums as the only safe guide to the information which is sought, and to be influenced by the intestinal symptoms only to the extent of seeking some more digestible mercurial preparation. If, during the early days of treatment, and before the premonitory symptoms of ptyalism appear, there is considerable amount of colic and diarrhœa, I usually withdraw the protiodide and give the patient the following recipe:

℞ Hydrarg. cum creta . . . . ʒj
Ft. pil. no. lx.

I instruct him to take these in the same way, increasing the dose each day, but I expect to get a somewhat more marked effect from one-grain pills of gray powder than from an equal number of one-third-grain pills of the protiodide. If this second attempt fails and gastrointestinal irrigation precedes ptyalism, I usually try the bichloride:

℞ Hydrarg. chlorid. corrosiv. . . . . grs. iv
Confection. ros. . . . . q. s.
M. et ft. pil. no. lx.

Or:

℞ Hydrarg. chlorid. corrosiv. . . . . grs. ij
Mucilag. acaciæ,
Aquæ . . . . āā f℥ij
M. et S. Teaspoonful freely diluted as directed.

If this fails, I proceed to the employment of inunctions in the manner to be hereafter described (see p. 754).

In cases where the circumstances of the patient, such as constant traveling, or the necessity for concealment, absolutely forbid the use of inunctions, opium may be combined with one or the other of the above formulæ in sufficient quantity to control the colic and diarrhœa until the full dose is ascertained. It should then be withdrawn. I may, however, say here as appropriately as anywhere, that I believe the use of opium in conjunction with mercurials in syphilis to be an unsafe practice. It has the high indorsement of Mr. Hutchinson, who says that Dover's powder may be combined with his favorite gray powder "if necessary." He sounds no note of warning, but it can not be denied that the general effects of the drug in the average case are undesirable. It tends to constipate, to reduce appetite, and to lessen eliminative processes, including the secretion of sweat and of urine. It renders uncertain the amount of mercury actually being absorbed, and it must never be forgotten that *the essential point in the treatment of syphilis is the administration, during a sufficiently long period, of the largest dose of mercury which can be taken and absorbed without prejudice to the general health.*

Merely to order that a certain dose be swallowed, and to provide for its safe escort under an opiate guard from one end of the alimentary tract to the other, is not to treat syphilis efficiently or intelligently. In larger doses opium is, of course, not only objectionable for the above reasons, but dangerous from the possibility of the patient's becoming habituated to and dependent upon it.

When I order it on account of the impossibility of using inunctions, I prefer to prescribe paregoric, and to tell the patient to take with each mercurial pill the smallest number of drops which he finds will prevent griping and diarrhœa. In this manner, better than by combination with the mercury or than by giving any fixed dose of opium, can the minimum quantity necessary be ascertained and employed.

Now under any of these forms of treatment, or under any method by which mercury is introduced into the system, there are certain symptoms which must be carefully watched for.

The surgeon has no intention or desire to produce salivation, and under careful management, with intelligent co-operation on the part of the patient, that accident will very rarely occur. The symptoms for which he is on the lookout are those premonitory to ptyalism. They are: (1) a thickening of the saliva; (2) an increase in its quantity; (3) a sponginess and tumefaction of the gums; (4) a feeling of lengthening of the teeth, with a little tenderness when they are brought sharply together.

It must not be forgotten that these symptoms become as fallacious and misleading as those associated with the stomach or intestines unless the hygienic condition of the mouth is fairly good. A mouth containing teeth in various stages of caries, with jagged or irregular edges, with deposits of tartar about the fangs, with foci of bacterial infection in and between the teeth and gums, irritated by the constant use of tobacco, or chronically neglected as regards the employment of the toothbrush, toothpick, and *rinse-bouche,* is in a condition to react violently to doses of mercury at a point far below the normal physiological susceptibility of the tissues.

If it is necessary to begin the treatment of syphilis in a patient with a mouth in such a state, its defects must be corrected at the earliest possible moment, and, if need be, the accurate determination of the proper dose postponed until later. In the majority of cases, however, and especially if the time of waiting for the appearance of constitutional symptoms be utilized as has been suggested (see p. 732), the mouth offers the safest and most reliable indication of the tolerance of the normal cells of the organism to the presence of mercury in the blood and tissues.

If any or all of the above symptoms appear and are unmistakable, the dose should be at once reduced, at first to two thirds, later to half that dose, if the persistence of these symptoms indicates a further reduction. This is then the standard dose, to be continued, except at certain intervals to be mentioned presently, over a period varying from two to three years.

If during this time there is an outbreak of syphilis, no matter how mild or insignificant, the dose should be at once increased to the "full dose"—i. e., that under which ptyalism began to appear—and this should be continued until the symptoms vanish, or until salivation is so distinctly threatened that diminution of dose becomes necessary. Whenever during the mercurial treatment the mouth, tongue, teeth, or gums become sore or tender, a mouth-wash of a saturated solution of potassium chlorate alternating with one of boric acid will serve a valuable purpose, and, indeed, may be used at intervals with advantage as a prophylactic, even in the absence of all symptoms of mercurialization. The treatment of well-developed salivation will be found in the section on The Poisonous Effects of Mercury (see p. 745).

The patient's weight at the beginning of treatment should be noted, and any subsequent variations observed and recorded. Those cases do best in which it increases or remains stationary. Those associated with rapid emaciation are usually the most dangerous and difficult of management.

If everything goes well, the symptoms which existed when treatment was begun will subside or disappear. The post-cervical, epitrochlear, and even the inguinal glands will grow smaller, though a certain amount of induration and enlargement will be persistent. If an eruption is present it will fade. If the beginning of treatment has preceded the exanthem the latter may be much delayed, but rarely fails entirely to put in an appearance. It may do so, however, as has been shown by a number of recorded cases.

For some years it was my custom to continue this treatment without modification for eighteen months; then to give "mixed treatment," mercury and potassium iodide, for six months; and then in the absence of symptoms to stop treatment altogether. I have, however, recently been more and more impressed with the necessity for *full* treatment and over *long* periods. On the one hand, my experience and observation corroborate Hutchinson's statement that "some of the most severe outbreaks we ever witness occur in those who have been rapidly cured by a short ptyalism in the early stage and have then left off the remedy" (*op. cit.*, p. 52), i. e., in cases treated fully but briefly. On the other hand, I am equally sure that Taylor is correct in his conclusions, although I do not agree with some of his reasons therefor (see p. 732), that a long-continued but feeble and insufficient treatment is even less effective than the short, vigorous courses which Hutchinson condemns. When an insufficient dose is conjoined with the interrupted system of treatment the results are only less disastrous than those obtained by the expectant or by the "opportunistic" system of treatment.

By way, therefore, of making certain that a proper quantity of mercury was being absorbed, I have of late years interrupted its administration by the mouth at stated periods, in order to employ it by inunction, not because I think any "tolerance" between the drug and the active cause of the disease has been established, but for the reason that its absorption from the digestive tract may diminish in course of time, and because the interval of rest is frequently beneficial to that tract. I therefore stop its internal administration at the end of three months. I go on, however, with an equivalent dose of mercurial ointment (℈j to ʒj), used after the method to be described presently (see p. 754). After two weeks' inunctions I return to the mouth treatment, and this alternation is continued during a period of two years. In this time the patient has about twenty months' internal treatment and four months' inunction.

At any time, however, that a syphilitic symptom is persistent and resists the "full dose" by the mouth, I withdraw the latter and substitute inunctions, or occasionally use both. If these fail, hypodermatic medication must be resorted to, and will be described later (see p. 759).

The routine use of the iodides in syphilis should begin at about the end of the second year in an uncomplicated case, and should continue for about six months. The theoretical reasons for their employment are not quite so clearly established as is the case with mercury. They are most useful in the stages and conditions of syphilis in which it has ceased to be contagious or inoculable or transmissible, and in which, therefore, the specific microbe is presumably absent from the tissues and the general circulation. For that reason the iodides do not appear to have a bactericidal or antidotal influence comparable to that of the preparations of mercury, nor does their behavior in relation to other micro-organisms favor this view. Furthermore, they are of little value in the early stages of syphilis when such an influence would be most potent for good. On the other hand, it seems probable that in the conditions which indicate the employment of the iodides, there is such an excess of cell-growth and accumulation either from renewed activity in the residua of antecedent disease, or from a crippling or obliteration of lymphatics due to the long-continued hyperplasia and irritation of the secondary stage (Otis), that stimulation of the absorbent system becomes the prime indication, and that iodine and its compounds meet it better than any other drugs at our command. The fact that they are more useful when given in combination with mercury does not militate against this view, as the influence of the latter in promoting destructive metamorphosis, fatty degeneration, and other retrograde changes in imperfectly organized exudates is well known, and would, of course, aid in the preparation for resorption and in its accomplishment. Be this as it may, the clinical reasons for giving iodides in the later stages of syphilis and in the presence of certain phenomena at any stage are at least as cogent and convincing as those which lead us to the administration of mercury.

Mixed Treatment.—I do not know a better formula for ordinary use than the old one containing sarsaparilla, although I have no faith in the so-called "alterative" qualities of this drug. It serves a useful purpose, however, in disguising the taste of the iodide, but it may be omitted if it is in itself disagreeable to the patient:

℞ Hydrarg. biniodidi	grs. iij
Potassii iodidi	ʒ ij
Syr. sarsaparillæ comp.	f ℥ vj.

M. S. Teaspoonful in three ounces of water four times daily.

If this seems to disagree or becomes very distasteful, the iodide may be given in compressed pills, and the mercury in pills or by inunction. Occasionally the other iodides are more easily digested than the potassium salt and sometimes a combination of the three iodides, as in the following formula, is more useful than any one of them singly:

℞ Potassii iodidi	
Sodii iodidi	
Ammonii iodidi	āā grs. xcvj
Syr. aurantii cort.	f ℥ j
Aquæ	f ℥ v.

M. et S. Teaspoonful freely diluted four times daily.

A formula which has the indorsement of Mr. Hutchinson, as efficient and seldom disagreeing, contains in each dose one-sixteenth grain of bichloride of mercury, four or five grains of iodide of potassium, and half a drachm of sal volatile.

The symptoms which indicate the *early* use of the iodides are chiefly those known as "precocious"—i. e., those which in ordinary cases appear at a much later period, and will be found to affect chiefly the fibrous or connective tissue, the bones or the important viscera. All cerebral phenomena thought to be due to syphilis, whether they are believed to result from endarteritis, from gummata, or from diffuse infiltration of meningeal or other structures, indicate the prompt addition of the iodides to the treatment. So, too, does the appearance of nodes, or of gummata of the soft parts, or of extensive ulcers, etc. The dose of the iodides, like that of mercury, but even more so, varies with the individual. Some persons can not take the doses given above without the immediate appearance of the toxic symptoms presently to be described; others are peculiarly tolerant. We know definitely, however, that the production of such symptoms is not an indication that the full physiological or therapeutic effect of the drug has been obtained, and it is a good rule to increase the dose gradually but steadily until at least the beginning subsidence of the symptom which led to its employment.

Hygienic Measures.—During all this period the general hygiene of the patient must be carefully looked after, and is only secondary in importance to the mercurial treatment. Recent researches have shown that in bacterial infection of almost every variety the gravity of the results is influenced by two factors: 1. The dose or quantity or number of the micro-organisms originally inoculated. 2. The resistant power of the tissue-cells of the organism, the index of which is found in the general health and strength of the individual. It is probable that "malignancy" in constitutional syphilis, like phagedena in chancre or chancroid, depends not upon any peculiarity of the infecting material but rather upon an excessive dose on the one hand with defective vitality on the other. Insufficient treatment is in effect equivalent to the former condition, as permitting the uninterrupted multiplication of the bacillus with accumulation of its tissue products. Injudicious or excessive treatment, by its prejudicial effect on the general health, brings about a diminution of the "vis medicatrix naturæ" which modern science has converted from a figment of the imagination into a well-recognized and powerful therapeutic agency.

The patient will usually need some detailed advice as to diet, mode of life, etc., and much of this may be given with advantage, as soon as the diagnosis is assured. It may be summarized as follows: He should avoid overwork, mental strain, undue exposure, excesses of all sorts. He need not practice total abstinence from alcohol, but should drink only light wines at meals, and in great moderation. The less tobacco he uses the better will be his chance of escaping mucous patches of the mouth, tongue, and throat, laryngitis, ulceration of the Schneiderian membrane, etc.

If any of these exist, or if a tendency to their recurrence has been distinctly shown, tobacco in all forms should be positively interdicted. Sexual intercourse should be guarded, for the sake of the participant and of possible offspring who may be infected and will probably through the placental circulation infect the mother. It need not be prohibited as in itself injurious, but should certainly be moderate.

The hereditary tendencies and personal diathesis of the patient should be studied. Every depressing influence acts on the side of the disease. One of the most prejudicial is tuberculosis in the form recognized clinically as struma. While the old idea that struma and syphilis are essentially identical has had no distinguished supporter since the elder Gross, and is now not tenable, there can be no doubt that the two conditions react upon each other to the great disadvantage of the patient, and that strumous patients are especially liable to the development of deep and obstinate ulceration, to osteitis and caries, and to various visceral changes. A tubercular family history should therefore be regarded as an indication for special hygienic precaution. The patient should, if possible, spend a part of each year at the seashore or in mountain air; wet feet, chilling of the surface, sitting in draughts, etc., should be particularly guarded against, as should traumatism, especially bruises of the subcutaneous tissues and strains of the larger joints.

The diet should be rich in digestible fats and carbohydrates. Pulmonary and general gymnastics should be employed. Emulsion of cod-liver oil and the iodide of iron are the most useful adjuvants to the formal specific treatment in such cases.

Gout and rheumatism, hereditary or acquired, have always appeared to me to influence unfavorably the course of syphilis. They predispose to vascular degeneration, to cerebral diseases secondary to endarteritis, to troublesome papulo-squamous syphilides, especially the palmar and plantar varieties, to iritis, and to periosteal nodes and various other affections of fibrous tissue. Such patients should have a strictly regulated diet list, should be told to eat sparingly of dark meats and of sugars, to drink freely of Poland or Lithia water, and to eschew sweet wines, malt liquors, etc. They may with advantage be given occasional short courses of the salicylates, and should have the iodides added to their mercurial treatment at an unusually early period.

If the patient is of the neurotic type the preliminary advice should be particularly directed to the avoidance of worry and anxiety. The prognosis should be put in as cheerful a way as seems justifiable; difficulties and dangers should be minimized and restrictions made light and easy, and treatment as unobtrusive as possible. Long hours of rest are particularly desirable in such patients. Strychnia and phosphoric acid are useful adjuvants to the medicinal treatment.

Intercurrent diseases, such as malaria or influenza, must of course receive the usual attention, and should be treated as would be proper in the absence of syphilis, although they may render necessary some modification of the systematic medication; occasionally they lead to a resort to the hypodermatic method (see p. 759).

A description of the methodic or routine treatment of syphilis would be incomplete without a more detailed account of the toxic symptoms produced by the two drugs chiefly employed—mercury and iodine—as it has been repeatedly stated that those symptoms must be carefully watched for and avoided.

The Toxic Effects of Mercury.—Hydrargyrism.—1. *Acute.* During the employment of any preparation of mercury, however administered, whether by the mouth, by inunction or fumigation, or hypodermatically, certain symptoms may make their appearance, indicating that the limit of tolerance of the system to the drug has been reached. The first and most important are those relating to the mouth. They consist, in the mild form in which only will they be seen by the careful practitioner whose orders are complied with, of a slight inspissation of the saliva, which becomes stringy, tough, and tenacious, and increased in quantity; a little congestion and sponginess of the gums, which bleed readily when touched; slight tenderness of the teeth, especially of the posterior molars, when the jaws are brought together with a snap. Marked metallic taste in the mouth and fetor of the breath indicate a slightly more advanced stage of mercurialization; while ulceration of the gums, congestion and œdema of the whole oral mucous membrane, loosening of the teeth, an enormously increased flow of saliva, swelling of the tongue, the soft palate, the submaxillary and parotid glands, etc., are the symptoms of full salivation, produced intentionally by our not very remote predecessors in the treatment of syphilis, but rarely seen at the present day. The disrepute of mercury with the laity, which lasted for so many years and is yet by no means effaced, may be readily understood when we picture the condition of such a patient, unable to masticate, to swallow, or even to speak, with the saliva flowing at the rate of pints daily, the breath frightfully offensive, the strength failing rapidly from malnutrition, etc., and remember that in addition he was kept in a close, overheated, unventilated room, and was sweated, purged, and even bled in addition! Fortunately, we have left far behind us that sort of empirical and unreasoning therapeutics, and except in the unusual cases where a dispensary patient fails to report for observation and at the same time overdoses himself, we almost never see well-developed cases of salivation.

Occasionally, as a result of idiosyncrasy, dermatitis will develop during mercurial treatment. A remarkable case of acute cutaneous mercurialization is reported by Mauriac (Gaz. des Hôpitaux, August 9, 1892.):

The patient, a young man of eighteen years, suffering from papulo-erythematous syphilide, left the hospital almost cured after a course of treatment consisting of 0·03 gramme (one half grain) of protiodide of mercury thrice daily; at no time showing any mercurial symptoms. However, in a few days he had a second outbreak of the syphilis, more severe than the first, and returned to the hospital, where he was treated this time with inunctions of one drachm (four grammes) of mercurial ointment daily. His skin was naturally very soft and delicate, and at the end of the fourth day the skin in those parts which had been rubbed with the mercury became a lively red, as in eczema rubrum, and in less than twenty-four hours the entire surface of his body was covered with a scarlatiniform eruption of an extraordinary, intense color. The temperature rose quite high, and the pulse became very rapid. A remarkable fact was that, in this mercurial intoxication, the mucous membranes were not affected in the slightest degree, and there was absolutely no salivation. On the second day the papulous syphiloderm seemed submerged under this violent erythematous seizure; but more remarkable yet, on the fourth day it vanished as if by enchantment. Such rapid cures are occasionally effected by inoculation of erysipelas, but rarely by four days of mercurial inunction. The fever and erythema subsided in five days, followed by desquamation of the epidermis. Mauriac regards this cure as effected not so much by the mercury acting upon the syphilitic process directly, as by the fever produced by the mercury. Nor does he think that the cutaneous irritation had much to do with effecting a cure; otherwise we would find cures effected by the application of croton oil, or other irritant. Morel-Lavallée has reported a case of mercurial fever and erythema which endangered life not only by the lesions of the skin, but also by visceral and cerebral hyperæmia. It may be assumed, therefore, that an acute, general, mercurial erythema, with febrile reaction, is sometimes a very favorable event in the treatment of syphilides; under the double action of the fever, and perhaps the erythema, the cutaneous relapses of syphilis disappear with an unexampled rapidity, which can not be equaled by general or local specific treatment. However, the cure is unhappily but short-lived.

Hutchinson has reported (*op. cit.*, p. 173) a case in which during the coexistence of the chancre and a papular or small pustular syphilide the administration of mercury was followed by rapid extension, inflammation, and ulceration of both chancre and syphiloderm, so that the former became almost phagedenic and the latter rupial in character. The withdrawal of mercury and the substitution of potassium iodide resulted in the immediate subsidence of these symptoms.

2. *Chronic.*—In other cases the whole digestive tract suffers, and the general constitutional effects of the drug are prejudicial. The patient becomes morose, gloomy, and depressed, or weak, nervous, and hysterical. The appetite fails, there is a chronic catarrhal condition of the gastro-intestinal mucous membrane; flatulence, heartburn, eructations, and even vomiting are common; emaciation begins and is progressive; albuminuria

may appear and great muscular weakness and general debility exist. The only difficulty I have found in relation to these cases is that of diagnosis, but this is sometimes a grave one. The same group of symptoms, or a very similar group, may be produced by syphilis itself, and may indicate insufficient rather than excessive treatment. The mental phenomena certainly are as frequently due to the patient's knowledge of the character of his disease and to the morbid introspection and unwholesome imaginings to which this often tends as to any effect of mercury. I have never been able to differentiate to my own satisfaction the "awful gloom" which is described as a rare symptom of the ingestion of mercury (Keyes, *op. cit.*, p. 559), and the similar mental state which is due to syphilis, or rather to the consciousness of the existence of syphilis, for I have seen it just as marked and as profound in syphilophobia, when no infection of any sort had occurred and no mercury had been given. The other symptoms above mentioned—anorexia, emaciation, etc.—may also result from the disease or from the depression produced by it. If, however, the patient has no evidence of visceral syphilis and is not brooding over his condition, but has been taking mercury by the mouth for long periods and in full doses, the above group of symptoms may usually be attributed to the drug.

Lang (Centralblatt für die gesammte Therap., January, 1892), at the International Congress at Berlin, emphasized the necessity for the close observation of all symptoms, both previous and attendant, in cases where any of the preparations of mercury are exhibited. When a syphilitic patient is afflicted with any other severe malady, such as nephritis, tuberculosis, malaria, etc., and when he has any ailment, confessedly independent of syphilis, he thinks there should be no mercurial treatment until the other conditions have been corrected. If there be merely a derangement of the intestinal canal, this must be regulated before any mercury is administered. Kidney affections, which usually develop in the early stage of the generalization of the disease, are to be considered, where other etiological factors may be excluded, as either the direct effect of the syphilitic virus in the substance of the kidney, or as the excretion of the metabolic products induced by the virus. In the former case the nephritis may be infectious; in the latter, purely toxic, or syphilo-toxic. Such kidney affections demand immediate antisyphilitic treatment, often mercurial; but it must be remembered that nephritis may be of mercurial origin, and this, according to Lang, occurs oftener than is commonly supposed. Fürbringer has shown that the ordinary mercurial treatment can, in fact, induce the secretion of albumin. Lang has found albuminuria occurring not infrequently during even a mild use of mercury, so that the presence of albumin in the urine can afford as decided a symptom of poisoning as affections of the mouth or of the intestinal tract. Mercurial treatment, therefore, howsoever administered, demands the closest attention, not alone to the oral region and to the intestinal tract, but to the kidneys.

On the other hand, Petersen (Berlin klin. Wochen., No. vi, 1892, p. 129) has made over three thousand analyses of the urine of two hundred syphilitics. His conclusions are as follows: 1. It is necessary to examine the urine of all syphilitic patients on their admission to hospitals or clinics. 2. It is important to ascertain whether the albuminuria is false or true. 3. Albuminuria occurs in the first and second stages of syphilis in the proportion of 3·8 per cent, and 5·9 per cent in tardy syphilis. 4. In treating syphilis by the salicylate of mercury, albuminuria is very rarely observed. It is unjust to hold that mercury causes albuminuria, as maintained by Guntz. It is probable that the friction of mercurial inunctions may have some causative influence. 5. The elimination of mercury by the kidneys does not produce albuminuria. 6. Syphilitic albuminuria disappears under mercurial treatment.

Bouchard has reported a fatal case. Gubler believes that mercurial albuminuria is a constitutional rather than a renal condition. Ollivier draws a parallel between mercurial and lead poisoning as regards nephritis.

Treatment of Mercurial Intoxication.—Salivation may best be avoided by attention to the condition of the teeth, mouth, and gums, the frequent use of a soft toothbrush with some astringent mouth-wash, the avoidance of any collection of food between the teeth by the proper employment of the toothpick, or of silk thread run between teeth that are very closely set together. The grave form which has been described is never fulminant, or even very sudden, in its onset. The premonitory symptoms can always be recognized. They indicate the immediate reduction of the dose which is being taken, or, if they are a little more severe, may necessitate the temporary stoppage of mercurial treatment.

As to the effects of mercury upon the nervous system, I have seen very little in my own practice of the grave conditions which have been ascribed to it. I must confess to considerable skepticism as to the existence of many of them, and to absolute incredulity as to their frequent occurrence. As it may be possible, however, that where treatment which I would regard as unnecessarily vigorous has been employed, these symptoms, or some of them, may occur, I copy the following *résumé* of the views of Maréchal (Thèse de Paris, 1885) without further comment:

"1. Slow mercurial poisoning gives rise to a certain number of nervous troubles which constitute the greater part of its symptomatology. 2. These nervous troubles can be attributed, in part, to the presence of mercury in the nervous centers, where it has frequently been found, and in part to lesions of the cerebro-spinal system, which have been described by Wising. One of the most curious characteristics of these lesions is the persistence of the axis cylinder in the altered regions. This last condition is found in the lesions of sclerosis in plaques, which, moreover, in its clinical features shows some analogies with cerebro-spinal hydrargyrosis. 3. The nervous troubles of hydrargyrosis are: (*a*) Disturbances of motion; trembling, analogous to that of sclerosis in plaques; convulsive phenomena of various kinds (cramps, epileptiform attacks, etc.), choreic movements, apoplectiform ictus, paralyses presenting the features of paralysis of cerebral origin. (*b*) Disturbance of sensibility; anæsthesia, presenting the features of anæsthesia of cerebral origin; painful phenomena, of which the most constant are the arthralgias and cephalalgias. (*c*) Disturbances of a psychical nature, which are at first excessively emotional; disturbances of sleep, vertigo, and toward the last dementia, very much resembling senile dementia. 4. In general, these nervous disorders persist for a very long time; they may be greatly benefited, but only rarely can an absolute cure be obtained" (Journ. Cut. and Gen.-Urin. Dis., vol. iv, 1886).

The two remedies which are most useful when ptyalism has reached a stage which requires special treatment are potassium chlorate and atropia. The former may be used in saturate solution as a mouth-wash, a small quantity being taken internally. I usually prescribe at the same time a disinfectant and astringent mouth-wash to be used alternately—a favorite formula being the following:

℞ Acid. boric.
Acid. tannic . . . . āā ℈ iv
Mel. rosæ . . . . f ℥ ij
Aquæ . . . . f ℥ vj
M. et S. Use as a mouth-wash.

The atropia should be given by the mouth, in the shape of tablets or powder, allowed to dissolve on the tongue. The dose should be a very small one, frequently repeated, until the characteristic effect upon the pupil begins to show itself.

℞ Atropiæ sulphat. . . . . gr. $\frac{1}{32}$
Sacch. lactis . . . . q. s.
M. et ft. chart. no. x.
S. One powder every three or four hours.

The same remedies are of value in the most severe forms of salivation, and to these should be added the local use of silver nitrate in solution (twenty or thirty grains to the ounce of distilled water), mouth-washes of more decided antiseptic value, as potassium permanganate, sprays of hydrogen peroxide, etc. Heat (see p. 789), and the use of diaphoretics, are strongly recommended, and by favoring eliminative processes should certainly be useful.

In the chronic forms of hydrargyrism, the diagnosis once being assured, the withdrawal of the drug is, of course, indicated, and this should be followed by scrupulous attention to hygiene, change of scene and air, a regulated diet, and the administration of ferruginous and other tonics. If it is necessary to begin again the use of mercury, it should be given by inunction or hypodermatically.

The Toxic Effect of the Iodides—Iodism.—The term *iodism* should be understood to include the various forms of iodic intoxication, the most common of which are gastro-intestinal irritation, coryza, lachrymation, mental depression, tinnitus aurium, and a pustular eruption (acne) upon the cutaneous surface of the body. While this pustular eruption is the most frequent exanthem produced by the iodides, it is true, as taught long ago by Ricord, that there is hardly any form of acute cutaneous eruption which they may not excite—erythema, eczema, and herpes being not uncommon. Bumstead (American Journal of Medical Sciences, p. 99, July, 1871) has described a case of pemphigus produced by the administration of the iodide of potassium, and states that Boinet quotes Cazenave as having seen a similar case. Since then, Tilbury Fox, Duhring, Finny, Duckworth, Thin, and others quoted by Dr. George F. Duffey (The Dublin Journal of Medical Sciences, April 1, 1880), in an article upon iodic purpura, have all recorded similar cases. Purpura, the most profound result of the influence of the iodide upon the skin, has been observed in a large number of cases, and has been very fully described in the article above mentioned. It seems probable that these various forms of skin diseases are to be referred to the liberation of a lesser or greater quantity of free iodine in the tissues, although this has by no means been demonstrated. Binz (Revue des Sciences Médicales, tome v, p. 485) believes that, in the presence of the oxygen of the blood and the carbonic acid of the tissues, iodide of potassium is transformed into the bicarbonate of potassium with the liberation of free iodine. Kaemmerer describes this change as occurring in the blood and not in the tissues.

Thin (Medico-Chirurg. Transactions, vol. lxii, p. 199, 1879) says that "the rationale of iodide eruption seems to be that there are conditions in which iodine, when present in the blood, attacks and disorganizes the blood-vessels at certain localized points. As a result of this injury to the wall of the vessel there is an escape of blood fluid into the surrounding tissue." He thinks that the papules of iodide acne, pemphigus, and purpura represent different degrees of involvement of the blood-vessels. The first is due to a limited œdema, with congestion; the second, to an effusion of serum, with more or less of the formed elements of the blood; the third, to destruction of the wall of the vessel and hæmorrhage. Microscopical examinations in cases of death during the existence of iodide eruptions have seemed to confirm these observations. Duckworth has called attention to the relation of chronic nephritis to iodism, believing that, when the elimination is reduced by kidney disease, the drug is maintained for a longer time in contact with the tissues. Dr. George Johnson has noted the frequency of iodism in cases of chronic Bright's disease (Lewin on the Untoward Effects of Drugs, p. 111). Stewart, of Montreal (Therapeutic Gazette, March 15, 1889), makes the same assertion, and says there is abundant proof for the statement that "the less the elimination through the kidneys, the greater the danger of iodism." (See further, p. 794 *et seq.*). Ehlers (Hospitalstidende, 1889, vol. i) has experimentally confirmed these views.

Mr. Hutchinson represents the views of the majority of syphilographers when he states that "the skin eruptions which may be produced by the iodides are very various in their characters; they are certainly due to idiosyncrasy, and have little or no relation to the dose employed"; and again, "the iodide of potassium is one of those remedies of which it is curiously true that in many persons the dose makes little or no difference in its effects; one grain may produce iodism in some, while one drachm will not in others. . . . There is, perhaps, no drug in which the influence of idiosyncrasy comes more frequently or more permanently into play. To some patients even very small doses are poisonous, while a large majority can take indefinitely large ones with impunity."

In the doses which have been recommended in the ordinary treatment of an average case of syphilis a certain proportion of patients will have no symptoms at all from the use of the iodides; a larger proportion will be troubled with a coppery taste in the mouth, and with an acneiform eruption affecting the face by preference but often widely distributed; coryza, lachrymation, slight conjunctivitis, are common, as are dyspepsia, heartburn, and other gastro-intestinal symptoms. A far smaller proportion of cases will have general swelling of the mucous membrane of the pharynx and larynx, sometimes going on to œdema of the glottis, which, in one reported case, was so severe after only four ten-grain doses had been taken as to necessitate tracheotomy; the usual small papular or pustular eruption may in such patients become of great size and depth, resembling a crop of furuncles, or it may become hæmorrhagic or purpuric in character.

The treatment of these conditions varies with their gravity. In the most severe forms, of course, the drug must be instantly withdrawn, and active tonic treatment instituted. Digitalis in combination with other diuretics is indicated. It may be given in such cases with Basham's mixture with great advantage. Small doses of arsenic are useful. Hygiene must be carefully looked after.

In the milder cases of iodism, if it is important that the drug should be pushed, it must not be forgotten that the present intolerance or idiosyncrasy may disappear if we persevere. Such cases are common in the experience of every syphilographer, and should prevent a too early withdrawal of iodide treatment if there is a clear indication for it. In these lighter cases a few drops (two to four) of Fowler's solution, with each dose of the iodide, will often control the iodism perfectly. The gastro-intestinal symptoms may be very persistent and annoying, but *large* dilution of the iodide solution with some bland fluid like albumenized water or weak infusion of flaxseed will often control them.

The various formulæ and methods for administering the iodides will be described later. The important question of the value of iodism or its absence in the diagnosis of obscure cases of syphilis will also be discussed in the section on the use of the iodides (see p. 794).

THE METHODS OF ADMINISTERING MERCURY.

We may now consider systematically the various plans of administering mercury and their relative advantages, and also the different preparations which may be employed: 1. By the mouth. 2. By inunction. 3. By hypodermatic injection. 4. By vaporization. 5. Mercurial and thermal baths; heat.

1. **By the Mouth.**—I have already described the preparations which I prefer to give by the mouth as routine treatment, and the mode of their administration.

A few of the other salts of mercury which have been used by the mouth, and a mention of some of the formulæ preferred by various syphilographers, may be of use, although I am strongly of the opinion that with the protiodide, gray powder, and the bichloride in varying doses and vehicles, there will rarely be need to employ other drugs for mouth ingestion.

The *tannate of mercury* has been used by Allen (N. Y. Medical Record, No. xii, 1892, p. 6) in fifty cases. He describes it as a yellow-green powder, without taste or smell, insoluble as long as it is not decomposed. Its simplest mode of preparation consists in precipitating a solution of nitrate of mercury by a solution of sodium tannate.

It may be given in its pure state as a powder alone, or combined with a few grains of tannin, or mixed with sugar or licorice powder. For children it can be given in milk. The dose is half a grain three or four times daily, or as often as symptoms indicate up to the point of tolerance. Petrini (Medical News, August 15, 1891) recommends the tannate in doses of two thirds of a grain made into a pill with extract of gentian and given at mealtime. The dose is doubled after ten days. Schwimmer (Die Grundlinien der heutigen Syphilis Therapie) has used it with good effects in the same form.

Allen believes it has the following advantages over other salts: 1. It is stable, and does not decompose easily. 2. It is assimilated and eliminated with rapidity. 3. It is possible to give it in large doses, without fear of dangerous complications, as its absorption and elimination are so speedy. 4. It does not produce ptyalism as easily as do the protiodide and calomel, though in some cases slight doses will do so. 5. Its employment is not so frequently followed by diarrhœa and gastro-enteritis, as is the case with the bichloride and protiodide, the tannate not being decomposed until it reaches the alkaline fluid of the small intestine. 6. It is well tolerated by children.

Lustgarten has also employed the tannate, and believes that its chief value lies in the fact that it will pass through the stomach without being acted upon by the acids therein contained. When it reaches the duodenum, the alkaline juices transform it into minute metallic globules and it is then easily absorbed, appearing in the urine twenty-four hours after ingestion. He does not depend upon it exclusively, but adheres to the modified intermittent treatment. He uses thirty to forty inunctions after the first appearance of secondary symptoms, and then gives five grains daily of the tannate. The dose begins with one grain and rises gradually to five grains, and a course of treatment consists of one hundred to one hundred and fifty grains. He has had no unpleasant digestive symptoms. His formula is the following:

℞ Hydrarg. tannici oxydulat. . . . . gr. jss.
Acid tannici,
Sacch. lact. . . . . āā gr. ¾
M. ft. in pulv.
S. One powder two or three times daily in gelatin capsules.

Or he uses the well-known soluble pills of one grain each, or one grain compressed tablets.

Fournier objects to the tannate as he does to the peptonate, on the ground that they are indefinite compounds, and believes that they will be quickly forgotten.

The *succinimide of mercury* has been employed and recommended by Jullien in pills of one third grain to one half grain, given twice daily. He has seen no gastric or other ill effects produced by it, and finds it generally well supported.

Neumann reserves the administration of mercury by the mouth for cases in which there are slight relapses, and for the purpose of keeping up a mild mercurial treatment when no symptoms are present. For the severer symptoms he prefers inunctions or hypodermatic injections. He uses the following formulæ, emphasizing the need for great care as to the hygiene of the mouth, and giving the medicine after meals:

℞ Calomel . . . . grs. v
Sacch. lact. . . . . ʒ ss.
M. et in chart. no. x div.
S. One powder after each meal.

When the calomel produces diarrhœa, he adds opium in the proportion of half a grain daily.

He finds that sublimate acts more quickly than calomel, but also more drastically:

℞ Hydrarg. chlor. corros. . . . . gr. jss.
Aquæ dest. . . . . f ℥ iv
M. S. Two to three teaspoonfuls daily.

℞ Hydrarg. chlor. corros. . . . . gr. jss.
Sodii. chlor. . . . . ʒ i
Aquæ dest. . . . . f ℥ vj
M. et S. One tablespoonful morning and evening.

Van Swieten's mercurial liquor is frequently of service:

℞ Hydrarg. chlor. corros. . . . . gr. jss.
Spir. vini rect. . . . . f ℥ iijss.
M. et S. One teaspoonful in milk or wine morning and evening.

Or in pill form:

℞ Hydrarg. chlorid. corros. . . . . gr. jss.
Ext. opii aq. . . . . gr. j
M. et in pil. no. xx div.
S. Two pills daily, increasing to five.

The most frequently used mercurial preparation he considers to be the protiodide of mercury:

℞ Hydrarg. iodid. vir.	grs. vj
Opii	gr. ivss.

M. et in pil. no. xx div.
S. Two pills each morning and evening.

Of the more recent prescriptions he prefers the following:

℞ Hydrarg. tannici oxydul., Sacch. alb.	āā gr. xlv

M. et in chart no. xxx div.
S. One powder t. i. d.

Also:

℞ Hydrarg. salicylat.	gr. v
Ext. quass.	q. s.

M. et ft. pilulæ no. xxv.
S. Two pills twice daily.

Or,

℞ Hydrarg. thymolat.	gr. xv
Ext. opii.	gr. vj

M. ft. pil. no. xxx.
S. Three pills daily.

The *carbolate of mercury* has been used by Gamberini and by Sadoc in doses of a third of a grain, two to six times daily. They report excellent results (Ann. of Univ. Med. Sci., 1888, p. 463).

The *salicylate of mercury* was first used in 1886, by Silva de Araujo, who was led by Gamberini's advice to consider the possible value of uniting two bactericidal remedies in one drug. He reports remarkably good results from doses of from about one third to one grain, three to six times daily. The drug was largely employed by Brazilian specialists, particularly in syphilitic iritis and other specific eye troubles. They claim that in many forms of obstinate syphilis it has succeeded where other drugs have failed. Buchler (Medical News, August 15, 1890) and Szadek add their testimony as to the value of this preparation. Neumann has reported twenty cases in which it acted satisfactorily.

Ipecac (one eighth grain) in combination with the *biniodide of mercury* (one sixteenth grain), in the form of tablets, has been said by Curtis (Journal of Respiratory Organs, September, 1800) to prevent effectually any unpleasant effects upon the mucous membranes. The above dose may be given, he says, ten to twelve times daily without producing any gastric or enteric symptoms.

Zittman's decoction has been used for so many years that, although it is an example of the polypharmacy of the days of old, and although its virtues, if it has any, are probably due to the large quantity of liquid taken with it and to the accompanying inunctions, it seems proper for the sake of completeness to give its formula:

℞ Sarsaparilla	℥ 12
Water	3 gals.

Macerate for twenty-four hours.

Put in a linen bag:

White sugar	ʒ 6
Alum	ʒ 6
Calomel	ʒ 4
Prepared cinnabar	ʒ 1

Hang the linen bag in the liquor and boil down, while adding four gallons more water, till the liquor has evaporated to two gallons. Remove the bag and add to the decoction:

Anise seeds	ʒ 4
Fennel seeds	ʒ 4
Senna leaves	℥ 1½
Licorice root	℥ 1½

Press and strain.

From a pint to a quart to be taken, in divided doses, during the day.

In applying this treatment Zeissl and others adopt the following plan (Hill and Cooper, p. 416): The course extends over four weeks or six weeks, and comprises strict diet and regimen, besides the inunction and daily potion of the decoction. The patient must be in bed for fourteen hours daily, and in his room for eighteen of the twenty-four. A light breakfast is given early, and one hour later a hot-water or vapor bath to procure sweating. While the skin is bathed in perspiration a rubber rubs in thirty to sixty grains of mercurial ointment, and the patient then lies for two hours, freely perspiring in the blankets. After this he rises, wipes the sweat off, and dresses in flannel underclothing. He then takes a light meal and walks for one or two hours if the weather be dry and not very cold. In the evening he returns to his rooms, is well covered with blankets, and sweats again for an hour before going to sleep. The next day the same course is repeated. The diet is limited to one meal of meat; the other consists of fish, eggs, and vegetables; and for drink, weak tea or coffee and milk. No fruit or alcoholic liquors are allowed. The medicines given consist of a pint to a quart of Zittman's decoction during the day, and every other morning a dose of Friedrichshalle or other saline purgative.

Blue mass has been employed by many syphilographers, and used to be one of Bumstead's favorite prescriptions. It is still the second choice of Mr. Hutchinson in routine treatment (see p. 728).

Bumstead preferred the following formula (Bumstead and Taylor, p. 853):

℞ Pil. hydrarg.	℈ij
Ferri sulph: exsiccat.	℈j
Ext. opii.	gr. v

M. et in pil. no. xx div.

S. One pill from two to four times daily.

If speedy action were desired, he ordered:

℞ Pil. hydrarg.	℈j
Hydrarg. chlorid. mit.	℈ss.
Hydrarg. cum creta	℈ij
Ext. opii	gr. v

M. et in pil. no. xx div.

S. From two to three or four pills daily.

I might indefinitely lengthen this list without, in my opinion, adding much to the practical value of this article. I have given enough varieties of both drugs and formulæ to permit of a wide latitude of choice, and it only remains to reiterate my opinion that in the large majority of cases the patient will be found to do well under one of these preparations I have described as preferable to all others, viz., the protiodide, the gray powder, or the bichloride.

2. **Inunctions.**—I was led to add the use of inunctions to my systematic treatment of syphilis by the realization of the fact that they had for years been my chief dependence in the accidents and emergencies of syphilis. Whenever during the course of the disease a patient developed iritis, or had persistent headache, or simply had an obstinate syphilide, it was my custom to add to the treatment by the mouth vigorous inunctions of mercurial ointment. The step from that to the occasional use of the same method in ordinary cases was a natural one, and the results were then so satisfactory that it soon became part of my treatment of every case.

The objections to it are obvious. Its uncleanliness, the eczematous irritation to which it gives rise, and the greater attention which it draws to the condition of the patient, operate most powerfully against it in private practice, and render it difficult in many cases to have it used systematically, while in some instances it can not even be attempted. Usually, however, an explanation of its advantages as regards the probability of permanent cure, and especially in relation to the disappearance of any existing symptom, will suffice to insure its acceptance by an intelligent patient.

Whenever it is employed, whether as the exclusive method of treatment, for the relief of a threatened or threatening outbreak, or, as I have recommended, in the intervals of treatment by the mouth, the following general rules should be observed : The same precautions as to hygiene of the mouth, the digestive tract, and the individual are to be taken as in any other method of treatment. There have been in my experience absolutely no reasons for insisting upon any special precautions, as avoidance of cold, for example. There is a widespread belief among the laity, participated in by some physicians, that during a course of inunctions either confinement to the house or extraordinary precautions to avoid chilling of the surface are necessary. I have often been asked about it both by patients and by medical men. No doubt the idea has descended to us from the mediæval days so well described by Fournier, when the unfortunate patients were debarred from the least breath of air, and were shut up in superheated rooms so saturated with mercurial fumes that the very walls were black, on whom the inunctions were performed before a blazing fire, and to whom were administered, in addition, no end of tisanes, laxatives, minoratives, dissolvents, digestives, eradicatives, sarsaparilla, etc. Naturally, frightful salivations followed, but they were hailed as blessings, and could be neither too intense nor too prolonged.

Astruc, a moderate in his therapeutics, ceased his friction when his patient reached the point of spitting a number of quarts a day. After the friction the patient was put to bed and clothing piled on him to create perspiration, and, as "sorrow's crown of sorrow," he was strictly enjoined to be "gay and cheerful"!

Fournier calls attention (Gazette des Hôpitaux, November 26, 1891) to the persistence of this old prejudice, especially in Russia and in Germany, where, he says, many patients are of the opinion that they must remain in their rooms while undergoing this treatment. This and all other precautions not already described as applicable to all forms of mercurial treatment are unnecessary.

The plan of prescribing inunctions which I have found entirely satisfactory is as follows: The patient is given a prescription for a mixture of equal parts of mercurial ointment and carbolated cosmoline. I have tried lanoline, but it is too gummy and sticky. Lard, recommended by Fournier, speedily becomes rancid, and the mixture is then very irritating. The undiluted ointment is also more irritating than the combination with one of the unguents having a petroleum basis. The oleate of mercury, which I used for a year or more some time ago, I found, as did the profession everywhere, far less efficacious than mercurial ointment.

After various experiments I have settled down to the use of the one above mentioned. It may be ordered to be put up in one lot and the proper amount withdrawn by guess at each time of using, but this is dangerously inaccurate.

It is better to employ the following formula:

℞ Unguent. hydarg.,
Unguent. petrolei carbolat. . . . . āā ℥ ij
M. et in part. no. xvi div.
S. Use one portion at bedtime.

The druggist should be instructed to inclose each dose in a compressible gelatin capsule, or in a "cachet" of stiff paper. Fournier orders fifteen drachms of the "double" mercurial ointment made up into seven "cartouches" (cartridges), remarking that the extra drachm represents about the quantity which is lost by adhesion to the paper. This is an attempt at a degree of exactness in dosage which, in view of the uncertainty of the amount absorbed through different skins, is not essential.

I have also found it answered very well to order the pure mercurial ointment put up in the proper doses, and to instruct the patient to anoint the region to which he was about to apply it with the carbolated cosmoline. This reduces somewhat the bulk of the material to be rubbed in, and in persons who have not irritable skins is sufficient precaution against eczema, a certain degree of which is practically unavoidable. The dose for a healthy adult varies from one scruple to one drachm daily. Most persons will bear the latter quantity very well for a course of inunctions extending over from two to three weeks. After that the danger of sudden and troublesome stomatitis as well as of annoying dermatitis increases, and the patient must be carefully watched.

I have found it well to select a number of places for the application of the ointment, and to tell the patient or attendant specifically where to begin and how to continue. Fournier's plan of using alternately the two sides of the thorax beneath the axilla must certainly, in a large proportion of cases, be followed by unnecessary cutaneous irritation. He adds, to be sure, that if the skin is unusually sensitive the antero-internal surfaces of the thighs and arms may also be employed, but I see no reason why this should not be done from the start. Then, too, the selection of a limited region of the body ignores the value of the direct application of mercury to the tissues, and by that much lessens its efficiency. Hutchinson some time ago (*op. cit.*, p. 54) said: "As regards its mode of influence in syphilis, we may reasonably suppose that it is requisite that it should be brought into contact with the cell elements concerned in the morbid process. Wherever its local application is practicable, we know that it is usually very efficient." Hallopeau thinks, indeed, that each manifestation of syphilis is a center of multiplication of the virus, a source of reinfection, which it is necessary to suppress (Journ. of Cut. and Gen.-Urin. Dis., March, 1890).

While I have seen numerous cases in which the salutary effect of the local contact of the mercurial with the syphilitic lesion was pronounced and unmistakable, I do not think, on the other hand, that in the absence of localized lesions the very inconvenient method recommended by Taylor (Hare's System of Therapeutics, vol. iii, p. 86) need be generally adopted. He divides the body into eleven regions, and includes the head and neck, the axillæ, the groins, and the legs, parts usually covered with hair, some of which, as the axillæ have a very thin and sensitive skin, and all of which are in my experience particularly liable to develop troublesome eczema very early in the course of treatment.

Fastidious patients object strongly enough to the dirtiness of inunctions at any rate, and they should not be made unnecessarily distasteful. If papular or pustular crustaceous lesions invade those localities, I have always been in the habit of ordering local treatment, usually by means of the ointment of the nitrate of mercury, or of ammoniated mercury (see p. 803); but, in my opinion, for the routine employment of inunctions it is better to avoid them.

I accordingly tell the patient to select the most accessible hairless regions as follows: The inner surface of the thighs, the antero-internal surfaces of the arms and forearms, the sides of the thorax, the loins, flanks, and antero-lateral surfaces of the abdomen; sometimes the buttocks, and the soles and inner surfaces of the feet. If a nurse or attendant is in charge of the case, the whole back may be included. In any event, by passing from one to the other of these regions in a specified order, the patient need not use any one of them oftener than once weekly, leaving ample time in the interval for the subsidence of skin irritations.

The time required for each inunction, if a drachm of mercurial ointment is used, should not be less than twenty minutes. If an attendant applies it his bare hands should be used. I have never known an instance of mercurialization of a rubber under these circumstances. I usually order my patients to bathe only about twice weekly during this treatment; but whenever in any particular locality marked irritation occurs, I direct that the skin there shall be at once washed clean and the following ointment applied:

℞ Hydrarg. chlorid. mit. . . . . ʒij
Unguent. zinci oxidi,
Unguent. petrolei carbolat. . . . . āā ℥ ss
M. et ft. unguent.

This is soothing, and at the same time keeps up mild local mercurial influence, if that is needed. In the absence of the latter indication, dusting the clean skin with ordinary rice powder, or with bismuth and starch, will usually suffice.

The best time to use the inunction is at night, before going to bed. I have not found it necessary to take any special means to promote sweating. Neumann thinks, indeed, that perspiration prevents absorption, and for that reason always orders the inunction to be used in the morning. During the treatment it is well to have the patient wear old underclothes day and night, which can be thrown away, or which need not be changed oftener than once a week.

As I have said, I employ two weeks of this treatment about once in three months in an average uncomplicated case. It may be kept up longer if there are reasons for so doing, and should undoubtedly be prolonged in the presence of relapsing syphilides of either skin or mucous membranes, or in cases in which visceral lesions are threatened. I may reiterate, however, my opinion that in ordinary—"benign"—cases of syphilis it is not necessary to employ this or any other troublesome and tiresome or painful treatment, to the exclusion of the administration of mercury by the mouth. It may be useful to append here the description given Mr. Hutchinson by a surgeon (himself a patient) of the routine method at Aix-la-Chapelle, which is so much frequented by syphilitics. It fails to corroborate Fournier's remarks (Gaz. des Hôp., November 26, 1891), that at Aix-la-Chapelle the frictions are still followed by a "séance de sudation." It fails also to show any sufficient reason for resorting to Aix for the purpose of using this treatment; but this subject will be briefly discussed later (see p. 786).

Many patients resort to Aix-la-Chapelle in order to go through a course of mercurial inunction for no other reason than the (supposed) difficulty of carrying out the treatment at home. The following directions will suffice, if attended to, to prevent serious inconvenience during such a course:

The patient should retire early to bed, and lie as long as possible in the morning.

There should be a fire in the bedroom if the weather be cold.

The ointment should be rubbed in at night. The patient should lie down naked on the bed or couch, a blanket or rug being spread beneath to prevent the soiling of the bed.

The ointment (which should be divided by the chemist into the prescribed quantities for nightly use) should be spread upon the chest and abdomen, and should be briskly rubbed in with naked hands over as large a surface as the hands can conveniently reach, for from fifteen to twenty-five minutes. A watch should be at hand to note the time. After the inunction a jersey and drawers must be put on and worn during the night, to prevent the soiling of the clothes and bed; but they need not be thick. Previously to putting them on the hands may be washed. The ointment is easily removed by free use of soap and cold water; easier still with hot water.

In the morning the body can be washed with warm or tepid water with soap. The night underclothes can be worn for a few times or a week, unsoiled clothes being worn during the day. The stain of the ointment is easily removed from garments by hot water and soap. At Aix the rubbing is always done by a trained attendant, but this is not in the least necessary.

I should at least mention the fact that some very distinguished authorities recommend the use of inunctions as the first choice for systematic treatment throughout Among these are Schwimmer (*op. cit.*); Kreis (Med. Correspondenzblatt des Würtemberg. ärtztlich. Landesvereins, Stuttgart, March, 1891), who thinks that inunctions give the best therapeutic effect, with the fewest accompanying disturbances, directs that the internal administration of mercury should be reserved for married women who do not suspect the nature of their malady, for those whose skin is very tender, and for those who want to conceal their disease. He recommends, in order that the skin may not be irritated by the mercury, that the ointment be prepared with benzoated lard, and that, twelve hours after the rubbing, the part be washed and powdered.

Kaposi (*Wiener med. Presse*, June 8, 1890) thinks that inunctions are far preferable to any other method. He adds: Administered in this way, the drug penetrates into the subcutaneous tissues, is transformed into soluble albuminoids, and, coming into contact with the specific virus, destroys its power. It is finally eliminated through the capillary vessels of the salivary glands, the mucous membrane of the mouth, stomach, and bowels, the liver, and the kidneys. The rubbing should not be pushed to salivation, but should be intermitted on the first sign of irritation in the mouth, as denoted by sponginess of the gums and thickness and ropiness of the saliva. This last sign is most readily elicited by causing the patient to open the mouth, when the salivary secretion can be seen drawn out in strings between the teeth and the tongue.

Kaposi thinks that certain people exhibit an idiosyncrasy toward inunctions—at times an eczema developing over the entire body—and that in these cases another method of treatment must be adopted. He prefers gray ointment, and uses from two scruples to one drachm daily.

The only contraindications to the method recognized by Neumann (*op. cit.*) are (1), the cases of delicate, weak, mostly blonde individuals, who are liable to severe acute attacks of eczema after inunctions, or (2) where the personal prejudice of patients in private practice has to be considered. The inunctions are to be made by the patient or by some one similarly diseased. This is a wise precaution in the presence of ulcerative secondary lesions, but is unnecessary under ordinary circumstances. A portion of salve the size of a pea is to be gently rubbed in until the skin is dry, then another portion in a similar manner is to be used on the corresponding part on the other side of the body, and so on until the requisite dose has been administered. The inunction has been well applied when there remains a gray color after wiping with a cloth, showing the salve in the pores of the skin. The average number required is thirty-five to forty, but they should be continued until all symptoms disappear. The dose is regulated according to the condition of the patient, or the effect desired, or the symptoms to be overcome.

Von Hebra (Internat. klin. Rundschau, October 6, 1889), McCall Anderson (Journ. Cut. and Genito-Urin. Dis., November, 1889), and others might be cited, but the list is sufficiently long to show the strong hold this method of treatment has upon syphilographers, and to present its claims fairly. Modifications of the method of inunction consist in the use of *mercurial soaps* (Schuster's, Oberlander's, Spillmann's, Dietrich's, etc; see Taylor's article in Hare's Therapeutics), but they are far more uncertain and inaccurate than the ointment, and, as Fournier says, although they are cleaner, require even more time for their proper application than the ointment.

Mercurial plasters of various kinds have been used from time to time. Brodie's method will be considered under the head of Hereditary Syphilis (see p. 809). Chassaignac employed the emplastrum de Vigo cum Mercurio, which contains metallic mercury triturated with styrax and turpentine and added to ordinary lead plaster. Unna (Taylor, *op. cit.*) uses a mercurial plaster mull, which he strongly recommends to persons compelled to travel, or much desiring secrecy.

Quinquaud (La Semaine Médicale, August 13, 1890) believes that a calomel plaster offers a ready and sure method of bringing the system under the influence of mercurials. This plaster is made as follows:

℞ Diachylon plaster	3,000 parts
Sublimated calomel	1,000 "
Castor oil	300 "

The plaster is melted and the calomel added while suspended in the castor oil. It is spread upon linen in certain definite proportions.

Before applying it the skin should be thoroughly washed with soap and warm water. A square decimetre (sixteen square inches) of the plaster is applied to the surface and left on for eight days. It is then removed, and reapplied after an interval of eight days. Examination of the urine showed that the mercury thus applied was absorbed. By employing not more than a square decimetre there is practically no danger of salivation. By doubling the dose—that is, the size of the plaster—a slight stomatitis is sometimes excited.

3. **Hypodermatic Injections.**—The superiority of this method of treatment to all others has been most extravagantly and persistently set forth by its advocates during the last ten years. Their claims are based primarily upon the shortcomings of the methods of mouth ingestion and inunction, and further, upon certain alleged advantages of the hypodermatic method itself. Gastro-intestinal irritation and dermatitis are, however, the only two undesirable conditions produced by the other plans of treatment which can with any certainty be avoided by the subcutaneous method, and even these occur occasionally.

The specific claims made by the enthusiasts and extremists who have been exploiting the method are as follows (Sukhoff, Damman, Elsenberg, Lang, Balzer):

1. *The practitioner remains master of the situation throughout.* This is one of the glittering rhetorical generalities indulged in occasionally by our Continental colleagues, which may mean anything or nothing, and to which a definite reply is always difficult. In this instance, under the most limited interpretation possible, it is not warranted by the facts.

2. *The drugs needed may be easily obtained in the pure state.* This is not peculiar to the hypodermatic method.

3. *They may be prepared for use by the physician himself.* This, if ever an advantage, is scarcely worth mention.

4. *In the use of the soluble salts of mercury a precise dosage is obtainable.* It may fairly be questioned whether the varying degrees of local reaction affecting the rapidity and the thoroughness of absorption do not give rise to as much variation in the dose as do the differences in absorptive power in the skin and the gastro-intestinal mucous membrane.

5. *It saves time and labor on the part of both physician and patient,*

rendering visits more infrequent, etc. This is doubtful, and not very important if true.

6. *It necessitates but little alteration in diet, habits of life, etc.* Such alteration under ordinary methods is practically only that indicated by the general rules of hygiene, and would be beneficial to most persons, non-syphilitics included.

7. *The patient's skin and digestive organs remain unaffected except in rare instances.* This is true, but is offset by the pain, the liability to abscess, and other objections to be described later.

8. *Stomatitis is of rare occurrence.* The evidence goes to show that with equal care it is more likely to occur during hypodermatic medication, and when it does occur comes on more suddenly and is more intense and uncontrollable than under either of the other methods.

9. *It enables the patient to conceal the disease.* This may have some little force when the method is compared with the inunction treatment, but is certainly a very minor point in any event.

10. *It lessens expense.* This is likewise of little importance, as the difference is not great.

11. *It is more likely to effect an entire and permanent cure, and does so in the shortest time and with the minimum amount of mercury.* This is, after all, the most important claim that is made, and if it could be established would warrant the adoption of the method to the exclusion of all others. I am of the opinion, however, that it can not be substantiated, and at any rate am certain that the time has not yet arrived for a final and judicial decision upon the matter. The evidence is contradictory, and is open to the suspicion of bias upon both sides, but especially and notably upon that of the advocates of hypodermics.

12. *In the presence of grave and imminently threatening visceral troubles it affords the readiest and surest way of producing a powerful influence.* This may possibly be admitted, although in the great majority of cases there is ample time for the employment of inunctions.

13. *In doubtful cases it shortens the time required for the "therapeutic diagnosis."* This is scarcely to be included among advantages belonging to a system intended for routine treatment. It is especially claimed for the hypodermatic use of calomel, and will be discussed in connection with that drug.

The objections to the method may be more briefly mentioned, as I believe they are all well founded:

1. *It is painful, and in many patients excites apprehension and is strongly objected to.* It might be added that the measures advocated to obviate or lessen pain, viz., the precedent or simultaneous administration of morphia or cocaine are in themselves highly objectionable and certainly to be discouraged.

2. *It is occasionally though rarely dangerous, and sometimes rapidly fatal.*

3. *It is liable to be followed by certain local complications which are: a, erythema; b, painful nodosities; c, cellulitis; d, abscess; e, sloughing.* While the percentage of these troubles is small in the reported cases, it must be remembered that the bulk of the enormous mass of literature referring to it which has accumulated during the last decade has been contributed by partisans. This prevents me from being much influenced by figures showing, for example, that "in 36,922 injections in 3,185 patients, suppuration occurred in 116, or less than one third of one per cent" (Damman, Aust. Med. Jour., March 15, 1892).

4. *It can not be carried on by the patient, but requires the constant, even though infrequent, intervention of the surgeon.* In attempting to review the contributions to this department of syphilology I shall not attempt completeness, both because of lack of space and for the reason that so much that has been written is, if not stale and flat, certainly weary and unprofitable. I have, during the last five years, summarized much of it in the section on syphilis in the Universal Annual of the Medical Sciences, and would refer to those volumes and to Taylor's comprehensive *résumé* in his admirable essay in Hare's System of Therapeutics, to which paper I must express my great indebtedness in the preparation of this article. I shall, however, describe the details of the method and its variations, and may then express my own conclusions as to its limitations and the circumstances which indicate its employment.

The two chief subdivisions of the hypodermatic method are based upon the solubility or insolubility of the mercurial preparations which are employed, the leading member of each group being respectively the corrosive chloride and the mild chloride.

The *technique* of their introduction is practically identical in both classes. The solution or emulsion used should be sterilized. The skin of the region selected for the puncture should be cleansed with soap and water, then with alcohol or turpentine, then with a 1 to 20 carbolic solution, and finally with 1 to 1,000 sublimate solution. The hands of the operator should be similarly prepared. The needle, which should be larger and longer than the ordinary hypodermatic needle, and the syringe itself, should be washed in 1 to 20 carbolic solution for at least fifteen minutes before using.

Any form of syringe may be employed, the essentials being that it is capable of complete sterilization, works easily and smoothly, and holds the necessary quantity of fluid. For some of the preparations employed a rubber syringe and a silver or gold needle are of advantage. For many of them the ordinary hypodermatic syringe, with the larger needle, will suffice.

Much has been written about the site of the injection and its depth. There seems reason to believe (see p. 755) that the local influence of mercury is of great advantage, and the existence of a serious lesion at an accessible locality may occasionally determine the point of injection. Usually, however, the post-trochanteric region has been chosen as one which is not subject to pressure, or to the observation of others, and which is not especially sensitive. The statement has been made (Taylor, *op. cit.*) that experience shows the thighs to be particularly liable to undergo suppuration, and that they should therefore be avoided. The same advice is given as to the arms and forearms. The only *a priori* reason which occurs to me in explanation is that the constant use and motion of these parts may favor inflammatory changes. They would naturally be selected frequently under ordinary circumstances for hypodermatic medication, and the fact of their special susceptibility to abscess ought to be fully demonstrated before they are excluded from the list of available sites. The regions where the skin is closely applied to bones, those where cellular tissue is scanty, and those subjected to pressure in ordinary positions, should be carefully avoided, as should those in which suppuration or sloughing would be followed by noticeable disfigurement. As to the depth at which the injection should be deposited the choice lies between the muscular tissues and the subcutaneous connective tissue. In my judgment the preference should undoubtedly be given the latter, as, if abscess occurs, it is much more easily managed than if it is subfascial.

The method of throwing in the fluid is identical with that of giving an ordinary hypodermatic injection. A fold of skin should be pinched up and the needle introduced parallel to its long axis and to the required depth. The point of puncture should be covered with the finger of the operator as the needle is withdrawn, and then with a little iodoform in collodion.

All these precautions can not prevent occasional microbic infection from the deeper layers of the skin, and unless the fluid used happens in itself to be antiseptic this accident will be followed by cellulitis (streptococcus infection) or abscess (staphylococcus aureus or albus).

We may now consider the special substances used in the two great groups.

1. **The Soluble Salts used hypodermatically.**—(*a*) *Corrosive Sublimate.*—The subcutaneous use of sublimate in syphilis was introduced by Hunter in 1856; Hebra in 1860, and Berkeley Hill in 1866 followed; but it was the work of Lewin at the Charité, in Berlin, that brought it prominently before the profession. Since then it has been employed in thousands of cases and by many hundreds of practitioners.

The dose is from one twelfth to one quarter of a grain dissolved in about twenty drops of distilled water. It may be given in an average case every second or third day until stomatitis is threatened, and may then be used at longer intervals. If selected on account of some emergency, larger or more frequent doses may be employed.

The special indications for its use are said to be gastro-intestinal irritation or idiosyncrasy in relation to the use of mercury by the mouth; similar conditions of the skin as to inunctions; the necessity for the use of the stomach for medication for intercurrent disease; the presence of grave syphilitic lesions resisting ordinary treatment; the existence of obstinate localized syphilomata. Its use is most successful during the secondary stage.

Various modifications of the formula have been suggested. Kratschmer and Stern added ten per cent of sodium chloride to the sublimate solution. Tchistiakoff used vaseline for the same purpose; he also recommends:

℞ Hydrarg. bichlorid.	grs. x
Acid. tartaric	ʒ ss.
Aquæ destillat.	℥ j

The formula used in the Berlin Poliklinik is:

℞ Hydrarg. chlor. corrosiv.	gr. ¼
Sodii chlor.	gr. ¾
Aquæ destillat.	f℥ i

M. Sig. Inject one drachm two or three times a week.

Lukasiewicz uses a five-per-cent solution of corrosive sublimate containing five per cent of salt. He injects a syringeful (Pravatz) weekly, and prefers deep injections in the gluteal regions. In his seven hundred injections he has found the treatment harmless, and says that only in cases where acute exacerbations of syphilitic symptoms, endangering vital parts, show themselves, need the interval be shortened. Six to eight injections were generally sufficient to effect a "cure." He recommends this treatment because of its rapid removal of apparent symptoms, and on this account believes it to be of special value in cases of sudden outbreak that must be dealt with speedily. Nerve lesions, complications of different kinds, and marked adenitis are, according to his views, special indications for this method of treatment, and he thinks such cases are especially benefited by it. Finger advocates in hypodermatic medication a one-per-cent corrosive sublimate solution having twenty per cent of common salt. Eichler has used this salt "with great success" in the early treatment of syphilis. He prefers small, frequently repeated doses, using one twelfth of a grain in injection daily for twelve days, then giving a rest of twelve days, then a second series of injections, followed by a pause, and then a third. He has found this series of thirty-six injections so far "sufficient to hold the disease in check." He has only once had abscess follow injection. The freedom from this complication he attributes to his strict asepsis, and to the use of a long, fine needle which injects the solution deeply into the tissues. The seat of injection is with him preferably in the back between the shoulder-blades. The solution which he uses is as follows:

℞ Hydrarg. chlor. corrosiv.	gr. j
Glycerini,	
Aquæ	āā fʒ j

M. S. Inject ten minims containing one twelfth grain daily.

Behrmann believes that aqueous solutions of the bichloride should be preferred to all other mercurial preparations employed in the therapeutics of syphilis, that hypodermatic injections of the solution are tolerated better than all other soluble or insoluble compounds; that the injections do not give rise to local abscesses; that stomatitis occurs but seldom, certainly more rarely than in the treatment by inunctions; that relapses occur less frequently, and have comparatively milder symptoms. These represent the most extreme views regarding this salt.

The use of sublimate mixed with oil is a form for which much is claimed in hypodermatic medication with this salt. The emulsions are prepared, according to Cruyl and Burlureaux, by dissolving the sublimate in ether; this requires about five volumes of ether to one of bichloride. This is then added to the oil, and the ether driven off by the application of heat. The proportion should be one per cent of sublimate in the oil. According to Cruyl, the fluid should remain clear, and can be filtered to remove any particles. He used one syringeful daily (Pravatz), ten or twelve injections being sufficient. Burlureaux used a mixture containing one centigramme of corrosive sublimate in twenty-five grammes (⅙ grain in ʒ v ℈iv). He has seen no bad effects; there was diarrhœa, but without colic, and stomatitis and salivation were absent. The dose used was one centigramme. Zeleneff, of Kiev, published a report of one hundred and four cases of syphilis treated by him with corrosive sublimate. The mercuric bichloride is first mixed with vaseline, then oil of vaseline is added in sufficient quantity to make an emulsion containing twenty-two per cent of corrosive sublimate. The injection preparation contains from a half to two grains (0·032 to 0·13 gramme) of the sublimate. In some cases an emulsion of the bichloride (36 grains = 2·33 grammes) in oil of vaseline (1 ounce = 37 grammes) was employed, the dose being one grain (0·065 gramme) of the sublimate. In either case the emulsion was warmed in hot water and then thoroughly shaken just before using. In the case of half-grain (0·032 gramme) doses, the injections were repeated once every four days; in that of one-grain (0·065 gramme) doses, every six days; and in that of two-grain (0·13 gramme) doses, every ten days. In all, nine hundred and fifteen injections were made, thirty-one patients being treated with half-grain doses, thirty-three with one-grain doses, and forty with two-grain doses.

The following are his principal deductions from the clinical inquiry: 1. In the case of two-grain injections, all syphilitic manifestations disappeared on an average after five or six *séances;* in that of one-grain injections, after eight or nine; and in that of one-half-grain injections, after twelve or fourteen. 2. The local reaction was trifling. 3. The bodily weight fell in thirty-nine out of seventy-four patients examined, while in thirty-five it increased during the course. 4. As to the bodily temperature, in forty per cent of cases the first injection of the sublimate "suspension" was followed by a rise. Subsequent injections did not make any impression on the temperature. 5. Of toxic phenomena were observed gingivitis, abdominal pain, and diarrhœa, with blood-stained stools. 6. Distinct traces of the metal appeared in the urine in about twelve hours after the first injection; after each subsequent dose the proportion of mercury markedly increased for from one to three days.

(*b*) *Asparagin-Mercury.*—Neumann used this drug in thirty-seven cases. Two and a half drachms of asparagin is dissolved in warm water, and oxide of mercury added to saturation. The solution is filtered after cooling, and the amount of mercury estimated. It is then diluted to make a one or two per cent solution of mercury as required. Unlike the solution that Wolff used more than ten years ago, it contains no excess of asparagin.

The daily injections were made under strict aseptic precautions in the interscapular region, one cubic centimetre (*circa* ♏ xv) of the one-per-cent solution, containing one sixth grain (0·01 gramme) of mercury being used in each injection. Only once was there any induration at the site of the injection. Stomatitis was observed once, as was blood in the stools. In one case a macular syphilide appeared during the treatment. The unpleasant symptoms noted disappeared after the omission of the drug for a short period. The injections were otherwise well borne, and the patients gained considerably in weight.

Of the thirty-seven cases, thirty had various syphilides and four had condylomata. One only belonged to the tertiary period. Two cases with initial lesions only were treated prophylactically, and in one case a syphilide appeared. The eruptions faded in about two weeks, and disappeared in from three to four weeks. The average number of injections was 36·5, and the average duration of the treatment fifty days. Three cases only relapsed. The especial advantage claimed for this preparation is the rapidity with which it enters the circulation and affects the syphilitic process, and the speed with which it is eliminated.

(*c*) Another of the more recent preparations is the *succinimide of mercury*, which has been before mentioned as used by Jullien in medication by the mouth. In hypodermatic medication this author recommends and has used it in a five-per-cent aqueous solution, in doses of one sixtieth to one twentieth of a grain. He had no bad effects.

The chief danger to be guarded against is the impurity of the drug. It rarely causes gingivitis. It sometimes produces a diarrhœa which is controlled by the stoppage of the medicine. Its hypodermatic use dispels symptoms much more rapidly than the internal use. It can be employed advantageously in all cases where the patient will allow it, and is especially recommended in cases complicated by kidney disease.

(*d*) The *oxycyanide* has been used by Boer in one gramme (gr. xv) injections containing 1·25 per cent of the mercurial. He claims for it the advantages over bichloride of not coagulating albumen; it is neutral or of alkaline reaction; it is less poisonous and caustic; its solutions are stable; it does not injure the surgical instruments so quickly.

(*e*) *Mercuric Albuminate* (Bamberger).—An unstable compound of white of egg, sodium chloride, and sublimate, of indefinite composition and liable to rapid deterioration, and (*f*) *Mercuric Peptonate* (Martineau), a mixture with similar defects, had a short period of popularity, but soon fell into disuse. Allied preparations, such as the "blood-serum mercury" (Bochhart), and the "hydrochloric glutin-peptone sublimate" (Hufler), are, as Taylor says, "polypharmaceutic refinements and therapeutic curiosities."

"Staub's fluid" and Gaillard's mixture, with a base of biniodide of mercury and sodium phosphate, may be included in the same category (see a review of Hypodermatic Medication for Syphilis, by Raymond, Gaz. des Hôpitaux, July 9, 1892).

There are various other salts that have been used and are now superseded by those mentioned, either because their solutions were unstable, as the peptone, or because of the pain or other serious symptoms which their use in hypodermic medication produced.

(*g*) *The Iodo-Tannate of Mercury* (Nouny) may be used in the following formula:

℞	Hydrargyri	gr. $\frac{1}{16}$.	
	Iodini	gr. $\frac{1}{4}$.	
	Acid. tannic	gr. $\frac{3}{10}$.	
	Glycerini	gtt. xv.	M.

(*h*) *Carbolate of Mercury* (see p. 751) has been used in doses of one sixth to one third grain, dissolved in fifteen drops of water, by various experimenters (Lexer's Archiv. für Derm. und Syph., 1889, p. 715).

Studies of the comparative effects of inunctions, and of this and other mercurial salts administered hypodermatically, showed the following proportion of relapses: Inunctions, nine per cent; sublimate, thirteen; salicylate, fifteen; formamide, peptonate, and gray oil, sixteen; tannate, eighteen; carbolate, twenty-seven. I have but little faith in these or similar figures, but this would seem to show that the advantages anticipated by Gamberini (who introduced the carbolate) (Giornale del. Mal. Ven. e del. Pelle, 1886, p. 241) from the combination of two germicides have not been realized.

(*i*) *The Formamide of Mercury*, in the daily dose of a Pravaz syringeful of a one-per-cent solution, was introduced by Liebreich and has been very extensively employed. Contradictory results have, of course, been reported, but the evidence goes to show that it is one of the most painful of the preparations used, and is not very stable.

(*j*) *Alaninate of Mercury*, introduced by De Lucca, was said by him to be preferable to all other soluble mercurials for hypodermatic use by reason of the smallness of the dose and the rapidity and permanency of its action, but these assertions have not been confirmed by later investigators.

(*k*) *The Benzoate of Mercury* is preferred by Balzer and Thiroloix (La Méd. Moderne, p. 47, Paris, January 9, 1890), who say that this salt coagulates albumen far less than other combinations of mercury, and hence exercises a less energetic action upon the cutaneous nerve filaments. In their hands it did not seem to cause gastro-intestinal complications or abscesses, and no cases of gingivitis ever went on to marked salivation. The objections to it are that many injections are required, that it deteriorates on keeping, and that it sometimes causes induration at the point of application.

Cochery also (Thèse de Paris, 1890) says that the fact that the benzoate does not coagulate albumen is the explanation of its comparative painlessness. He found that this, like other preparations, is not well borne by very stout persons, the presence in connective-tissue spaces of masses of fat presenting the satisfactory diffusion of the remedy. The same observation has been made by others. Brousse (of Montpellier) prefers this salt to all the other soluble preparations.

Cochery's formula is that of Stoukowenkoff. It is given in a mixture containing sodium chloride and cocaine.

II. **The Insoluble Salts used Hypodermatically.**—(*a*) *Calomel*, which may be taken as the type of the insoluble preparations, may be used in the dose of one half to one grain every four days, two grains weekly, or three grains every ten or twelve days. It may be given in one of the following mixtures:

℞	Hydrarg. chlorid. mit.	gr. ss.
	Glycerinæ purificat.	gtt. x
	Aquæ destillat.	gtt. x M.

℞	Hydrarg. chlorid. mit.	gr. j
	Mucilag. acaciæ	gtt. xx M.

℞	Hydrarg. chlorid. mit.	
	Sodii chloridi	āā gr. j
	Aquæ destillat.	gtt. xxx M.

The calomel used should be sublimated by steam and perfectly sterile.

The method in use by Besnier at the Hôpital Saint Louis may be given in detail. The formula used is calomel one part, oil of vaseline twenty parts. The calomel is incorporated with the petro-vaseline and well shaken, to put the insoluble substance in as perfect suspension as possible, and the mixture is then boiled a few seconds before making the injection in order to sterilize it. The operator should wash the hands in a mixture of alcohol and liquor of Van Swieten, and cleanse the part where the injection is to be made with some absorbent cotton wet with the same solution. The needle of the syringe should be similarly cleansed. The choice of location for making the injection is a point of the buttocks about three centimetres below the crest of the ilium, and an equal distance above and to the inner side of the great trochanter. The skin is displaced somewhat, so that there is no direct continuation of the puncture of the integument and that of the deeper tissues. The insertion of the needle is done quickly at one stroke down to the guard. The injection is then made gently, but some force must be employed to secure a passage of the emulsion into the tissues.

The employment of calomel subcutaneously was originally advocated by Scarenzio in 1864, but was not very extensively used except in Italy and Germany until the writings of Smirnoff, in 1883 and 1886, called renewed attention to it. During the interval Sigmund was the most prominent syphilographer who carefully investigated the claims which were made for it, reaching the conclusion that we can not hope to "cure" syphilis by a few injections of this or any other salt of mercury. Since then it has been used very largely, and its limits of usefulness, as well as its dangers, are now fairly well understood.

We may consider the latter first.

Locally, there is almost always pain of greater or less severity. This is denied by some of the advocates of the method, but I am convinced that not less than ninety per cent of the patients who have undergone this treatment would testify to the contrary. I have not used it very extensively, but I have yet to see the first case in which marked pain was not excited by the injection, sometimes subsiding soon after, but oftener increasing and lasting for hours or even days. I have never used morphia or cocaine at the same time, and think the practice very objectionable.

There is almost always an inflammatory reaction which, when slightly developed, causes merely a flush around the needle puncture, and a feeling of heat or itching. Lesser has reported a case of extensive mercurial erythema. Oftener there is an exudation of lymph with the formation of a hard, horny nodule, moderately tender to the touch, and very painful if subjected to continuous pressure. This is usually absorbed if asepsis has been good, but in a certain proportion of cases goes on to softening, to suppuration, and the formation of an abscess. It rarely or never disappears under two weeks, often persists for a longer time, as has been shown by Balzer at autopsies, and its disintegration is sometimes attended with extensive sloughing and cellulitis.

Constitutionally, calomel injections have produced the following unfavorable results: Stomatitis, in spite of the assertions to the contrary, has not been infrequent, is often very persistent, and is sometimes of a very grave variety attended with all the more dangerous phenomena of ptyalism (see p. 742). It is the more serious as it comes on suddenly (fulminating type), and is very rebellious to ordinary treatment. This intractability is probably due to the continuous absorption going on from the point of deposit of the drug, and has in more than one instance necessitated the excision of the indurated tissue thereabouts (Vogler has reported three such cases), and the cauterization of the walls of the resulting wound. Gastroenteritis and colitis have occurred (Besnier), and have even been fatal (Kraus), and two cases of pneumonia following a calomel and oil injection have been reported (Klotz), and were presumably due to oil embolism.

On the other hand, the influence of the drug thus used upon the symptoms of syphilis in the secondary stage, and its occasional value as an adjuvant to the iodides in the treatment of later phenomena when grave or dangerous, have been abundantly demonstrated. The most striking results have been obtained in specific eye troubles, but various forms of connective-tissue lesions have been reported as rapidly cured by its use.

There can be no reason to doubt its efficacy (if properly administered) during the secondary stage of syphilis. Mercurialization, however produced, is then at its acme of usefulness. There is much more reason to question the reported benefits in all forms of tertiary syphilis. It is contrary to the accumulated experience of the profession to find in late syphilis, gummata, periosteal nodes, osteitis, tubercular syphilides and other phenomena of similar character yielding promptly to the use of mercury alone. It is of undoubted value then as an adjuvant to or in conjunction with the iodides, but on both theoretical and clinical grounds can not be expected to supersede them.

Smirnoff's reported cases require confirmation. Taylor acutely says: "Smirnoff significantly remarks that if, during a course of injections in tertiary syphilis, aggravation of the symptoms occurs, they should be stopped at once, and the iodide of potassium should be substituted."

One possible advantage of calomel may be properly mentioned here. Jullien (Le Bulletin Médical, June 19, 1892) calls attention to its diagnostic value in doubtful surgical cases. He says:

> "The propriety of operating in certain cases is, in the experience of every surgeon, counteracted by uncertainties of diagnosis: an ulceration, a tumor of ambiguous identity, makes one suspect cancer, without casting aside all waverings toward the side of syphilis. The surgeon should, in such a case, institute a course of treatment to throw light as rapidly as possible on the obscure points." Under these conditions, Jullien says he can not too vehemently proclaim the superiority of calomel injections according to the Scarenzio-Smirnoff method: one twelfth grain (0·097 gramme) of calomel suspended in fifteen grains (0·97 gramme) of liquid vaseline, thoroughly sterilized, and injected once into the gluteal muscles under aseptic conditions. He says that no one can deny the profound influence which it exercises upon a syphilitic neoplasm, no matter what has been its duration. In five cases which he cites he determined whether a tumor was a manifestation of syphilis or not—i. e., whether or not operation was indicated. He adds, "Calomel by injection presents in the highest degree the qualifications of a test-medicine." He thinks that no argument can be brought up in opposition, and that, if the surgeon does not utilize this method, "it is not—it can not be—that he condemns it, but that he is ignorant of it." It may be discarded in the methodic, prolonged treatment of syphilis, but all its inconveniences are obliterated by two indubitable facts, in the presence of doubts concerning a malignant degeneration where "delays are dangerous." These two facts are: "1. That a therapeutic diagnosis of syphilis is clearly defined in eight days by injection of calomel. 2. In case of negative results, this treatment has not impeded the necessary operation in the slightest degree, and does not in the least complicate its results." However, even Jullien says that it must not be used blindly, and that it is best not to employ it in cases of marked albuminuria. If further experience confirms these observations, it will be one of the best practical results following the excessive (and

unnecessary) use of hypodermatic treatment which has been the fashion for some years on certain parts of the continent.

(*b*) *Metallic Mercury* has been used by a number of observers with the usual claims of little pain, certainty of results, absence of relapse, etc. The dose employed has been from five to twenty or thirty grains once weekly, followed by kneading and rubbing of the region. Von During and Augagneur have each reported a case in which a tumor formed and was persistent, and the former had in one patient such severe toxic symptoms as to necessitate excision of the nodule at the point of injection.

(*c*) *Gray Oil* (*oleum cinereum*) is a form of metallic mercury which has been much more widely used. It was introduced seven years ago by Lang, of Vienna. It is prepared by making an ointment or pomade of mercury with lanoline as a basis and then diluting this with almond or olive oil (Lang); or by triturating metallic mercury with ethereal tincture of benzoin and oil of vaseline (Neisser), or by combining with the mercury and lanoline a two-per-cent carbolized olive oil (Althaus).

However prepared, the aim is identical—i. e., to secure a minute subdivision of the metal, and to obtain complete fluidity. The reported results are again contradictory.

Lang warmly commends the method in a paper based on his experience for four years. Balzer and Reblaub (Gaz. des Hôp., July 9, 1882) used the formula of Neisser (of Breslau), accord to it some advantages, and compare it with the yellow oxide (q. v.). But Hallopeau, Lindstrom, and Kaposi have noted alarming cases of mercurial poisoning which Lang attributes, however, to the improper use of the oil. Matrasewski has shown experimentally that subcutaneous injections of oil may give rise to fatty embolism (a case of Klotz's has already been mentioned, see p. 768), and Lesser reports another case evidently of pulmonary embolism from the use of an emulsion of tannate of mercury in olive oil.

(*d*) *The Yellow Oxide of Mercury.*—Taylor says that this salt is to-day the most generally used hypodermatically of all the mercurial compounds, having largely replaced calomel. The evidence as to their comparative value is not so conflicting as usual.

Hebra, in 1889, recommended it as the best of all the insoluble preparations. Huot (Injections Mercurielles massives, Thèse de Montpellier, 1892) has compared calomel and yellow oxide, and thinks that while the calomel is the more active it is also the more irritating; Kuhn (Deut. med. Woch., 1888, p. 635) made the same comparison with the same result; Besnier gives similar testimony; Du Castel, who tried in a number of instances, in the same patients and at the same time, calomel and yellow oxide injected in corresponding parts of the body, says that the former is more irritating, but that he believes they are equally valuable as curative agents. Le Roy agrees with this latter observer. Sibilat says (Gaz. des Hôpitaux, July, 1892) that six injections of the yellow oxide correspond to four of calomel. The drug was introduced by Matrasewski, who gave up calomel on account of the pain and other unpleasant symptoms which it produces. His formula is:

℞ Hydrarg. oxid. flav.	gr. xv	
Acaciæ	gr. iv	
Aq. destillat.	f℥i	M.

He uses a Pravaz syringeful, and says that three to six injections suffice for a "cure," which, Taylor says, "it must always be remembered, means in the minds of most exploiters of hypodermatic mercurial preparations in syphilis the disappearance of a given set of symptoms or lesions." The following remarks of Taylor throw such a strong side light on this whole question of the hypodermatic treatment of syphilis that I quote them fully: "Tchernoguboff uses this preparation in doses of two grains every ten or eleven days, injected into the muscles. He says that syphilitic children from twelve to fourteen years old tolerate one-grain doses hypodermically very well, and are benefited. He thus treated one hundred and twenty cases, male and female, young and old, without any untoward complications. It is interesting to remember that Lesser observed abdominal pains, vomiting, and bloody, and mucoid diarrhœa after injections of yellow oxide, and never after calomel. The conclusion therefore is warranted that we can only get at the truth as regards the advantages and drawbacks peculiar to any and all preparations by a study of the experience of many men. It is never well to rely fully upon the assertions of the exploiter of a new mercurial preparation or combination. Thus we find that Dampekoff used the yellow oxide upon one hundred and seventy-nine syphilitic women, and that 'neither intense pain nor suppuration was produced.' Yet these women absolutely refused to allow the continuation of the treatment by reason of the severity of the pain. Then, on the other hand, Reshetnikoff, in the course of eighteen hundred injections of yellow oxide suspended in vaseline oil made into the gluteal regions, never met with an instance of local suppuration, and only once saw a diffuse sanguinolent infiltration, which disappeared without any bad result."

Kaposi has reported a fatal case with stomatitis, diarrhœa, and albuminuria.

(*e*) *The Neutral Salicylate of Mercury* was first introduced into the therapeutics of syphilis by Silva de Araujo (see p. 751). Szadek first employed it in hypodermatic injections, using it in the following formula:

℞ Hydrarg. salicylat.	gr. iij	
Mucilag. gummi arabici	♏ v	
Aquæ destil.	f℥ij	M.

He gave the injections at intervals of two or three days, affirming that they produced very little local manifestation. This is confirmed by many other writers.

Szadek, in his further investigation, has used both a five-per-cent and a seven-per-cent suspension in gum acacia, and found it of especial use in the secondary stage and in the relapses of that period, eight to twelve injections during a period of twenty to forty days' sufficing. Legius reports twenty-five cases with one hundred and twenty-six injections of this salt, using a ten-per-cent suspension in liquid vaseline; the dose was one grain and a half (0·10 grammes), given weekly. The local reaction was slight. There was no abscess. Eich, in the hypodermatic use of the salicylate, found the average duration of treatment in his cases to be twenty-seven days. The average dose was one grain and a half twice a week, and the average number of injections required was seven. In thirty per cent of his cases there were recurrent symptoms, coming on early and of severe character.

Neumann used this salt in eleven cases, and saw no local irritation. He employs a ten-per-cent suspension in paraffin, and injects every fourth day one (Pravaz) syringeful. Leichtenstein is convinced of the occasional prompt, searching, and energetic effect of the salicylate, but also says that in a relatively large number of cases it wholly fails, and is far surpassed by oleum cinereum. Petersen used the salicylate in fifty-four cases with one hundred and seventy-six injections, one and a half grain, weekly. Stuffer reports four hundred and thirty-five cases, in which the salicylate and thymol acetate were well borne.

(*f*) *Thymolacetate of Mercury* has been used considerably by hypodermatic injection. Its inventor, Welander, uses one grain and a half to fifteen of liquid paraffin at four-day intervals, and asserts that it requires about six injections to abolish symptoms.

Migneco says of this salt that its use in eighteen cases gave better results than those obtained from bichloride, the effect being more rapid and the sequelæ returning less quickly. He used intramuscular injections, one Pravaz syringeful of a seven-per-cent solution, made up as follows:

℞ Hydrarg. thymol-acetat.	gr. xxijss.
Mucilag. gummi arabici	gr. vijss.
Aquæ destil.	f. ʒ v

Löwenthal used intramuscular injections of—

Hydrarg. thymol-acet.	gr. xv
Glycerinæ	ʒ ijss.
Cocain. muriat.	gr. jss.

One Pravaz syringeful was the weekly dose. There was no pain or abscess formation, or even infiltration. In one case, in which there were decayed teeth, he produced salivation, and twice he observed a chill after the injection.

All symptoms disappeared after ten to twelve injections, and relapses were not of frequent occurrence. There were no digestive symptoms in the sixty patients whom he treated with two hundred and ninety-three injections. Szadek has also used a seven-per-cent mixture in eighteen cases and found it useful.

(*g*) *The Black Oxide*, *Protiodide*, *Red Oxide*, *Tannate*, *Sulphate*, *Turpeth Mineral*, *and Cinnabar* have all been used, and without exception the original experimenter has in each case found advantages possessed by no other preparation.

This does not begin to complete the formidable list of therapeutic suggestions that have been made, and, unfortunately for the patient, acted upon during the last few years. It will suffice, however, to elucidate the present state of the question, and make a basis for a reply to the following important queries:

1. Does hypodermatic medication in syphilis offer advantages which justify its adoption as a systematic method of treatment?

2. Under what circumstances, or in what classes of cases, should it be employed?

3. What are the indications for the selection of soluble or of insoluble salts?

4. What are the particular drugs which are to be preferred?

1. Even if it be contended that the question of the routine employment of hypodermatic medication in preference to other methods is still *sub judice*, it seems to me that there is little doubt that the evidence at present is overwhelmingly against it.

The positive objections to it I have already sufficiently considered. Marked pain, sensitive nodosities, cellulitis, sloughing and abscess, liability to disfiguring and permanent cicatrices, to a sudden and grave type of stomatitis, to violent entero-colitis, to pseudo-paralyses, albuminuria, pulmonary embolism, etc., even if they occur in but a small percentage of cases, make up a sufficiently formidable list of possible accidents to warrant a reasonable hesitation before giving up older and well-tried methods, practically free from danger, in favor of this one.

The objections to it by the patients themselves are a serious obstacle, in this country at least, to the practical success of the method. Even our hospital and dispensary cases constitute a much more independent class than the same sort of people abroad, and can not be subjected to wholesale experimentation with the same impunity. In Paris, Fournier has called attention to the fact that syphilitics flocked from the hospitals where this method was being tried to his service. In private practice here it is certainly difficult of adoption, and while it might be attended by the rapid disappearance of symptoms, there would often be an equally rapid disappearance of patients. My own patients have, without exception, objected strongly to both the bichloride and the calomel injections, the only two I have tried.

The figures which are gradually accumulating tend already to show that its employment according to current formulas brings with it another danger, viz., that involved in the encouragement of insufficient treatment, in the dependence upon the short and heroic courses which, as Hutchinson says, are often followed by the gravest and most serious tertiary phenomena (see p. 738).

The claim that by a few injections the time of treatment can be measured in months, or even in weeks, instead of in years, would seem, as Mauriac has said, to involve the idea that mercury given hypodermatically acquires some new and powerful curative property which, given in other ways, it does not possess. As a matter of fact, when we inject the insoluble salts we are merely leaving the chemistry of their transformation into the soluble compounds to the tissues themselves; when we inject the latter, we are simply reaching the general circulation by a somewhat more direct method than when we approach it through the capillaries and absorbents of the skin or the gastrointestinal tract.

I believe that, on the whole, while the final outcome of the experiences of the last few years will doubtless be for the advantage of science and the extension of our therapeutic methods, the information thus acquired will be at the expense of many patients who will suffer from the direct consequences of the method itself, or succumb to the ultimate developments of insufficiently treated syphilis.

The opinions of a few leading syphilographers, expressed within the last five or six years, will show that, to say the least, the method is still on trial.

Kaposi (Internat. klin. Rundschau, Vienna, April 17, 1892) says that only where inunctions are impracticable should injections be used. He had previously (Wiener med. Presse, June 8, 1890) stated his belief that "in both efficiency and safety the employment of subcutaneous mercurial injections must be placed below inunctions," so that his later opinion was evidently not reached hastily.

Neumann (Die Therapie an den Wiener Kliniken, Landesmann, 1891), after a careful discussion of hypodermatic medication in the treatment of syphilis, states that, from an experience upon about five hundred patients in his clinical practice and a large number of private patients, hypodermatic injections should be tried when the inunction treatment has failed. Injections with neither the soluble nor insoluble compounds of mercury prevent the recurrence of syphilitic symptoms. When used as a preventive treatment they are simply able to retard for some weeks the constitutional symptoms, with the exception of the ganglionic enlargement, which is never prevented. They are not particularly efficacious in grave forms of syphilis, particularly brain manifestations of the disease. Retinitis and iritis are not materially benefited; inunctions have frequently to be substituted for injections when these complications appear.

Neisser (Deutsche med. Woch., January 3 and 10, 1884) says, "I regard inunctions as the best means of obtaining the antisyphilitic effects of mercury."

Kreis (Med. Correspondenzblatt des Würt. ärzt. Landesverein, March, 1891) reviewed the whole subject, and recommended inunctions as giving the best therapeutic effect with the fewest accompanying disturbances, citing Von Zeissl, Von Sigmund, Lang, Leloir, Kaposi, and Neumann, as supporters of this view. He adds that "they have effected cures when the hypodermatic injections have failed," and says further that the latter, "in view of the uncertainty of their action, are not to be recommended."

In Paris, Besnier, after giving the method a full trial at the St. Louis, abandoned it. He says that all the facts point to the recurrence of syphilitic symptoms after the alleged "cure," and cites cases of his own, in one of which a patient in the height of his secondary stage, and only twenty-six days after the last five injections of calomel, had a specific meningitis which only yielded to drachm doses of potassium iodide (Journ. of Cut. and Genito-Urin. Dis., vol. v, 1887, p. 443).

Fournier (ibid., p. 349), about five years ago, was asked his opinion by Dr. Morrow, of New York. He answered: "My opinion is, it is not a good treatment. The injections are painful, they interfere with the patient's avocation, they necessitate frequently repeated visits. Above all, the method is not practicable. In private practice patients will not tolerate it. In hospital practice it is possible, but note the result: patients leave the Du Midi and Lourcine, where this treatment is employed, and flock to the St. Louis, where they know they will not receive it."

The same writer says, two years later (Journ. of Cut. and Genito-Urin. Dis., December, 1889): "Fournier is not a partisan of the method of subcutaneous injection, either of soluble or insoluble preparations of mercury. He relies upon the digestive and the epidermic routes for the introduction of the drug, giving the former the preference in the great majority of cases."

Still later (Rev. Gén. de Clin. et de Therap., 1889, p. 17), Fournier said, "As far as possible we should spare our patients the inconveniences of these injections, which can not take the place of other methods in the routine treatment of syphilis."

Brocq, after a critical review of the situation, arrives at the same conclusion (Gaz. Hebd. de Méd., 1887, p. 315). Hallopeau considers the method dangerous, and its alleged precision illusory (Bull. Méd., 1888, p. 1113). Diday (ibid., 1888), under the fanciful title, "A black point in the gray oil," adds his testimony as to the dislike of patients for this treatment.

Mauriac (Journ. of Cut. and Genito-Urin. Dis., vol. v, 1887) says that the curative effects of the injections of calomel are not superior to those obtained by the internal administration of the salts of mercury. He adds: "I have not found, up to the present time, any advantage in this method, and it presents, if not dangers of a serious nature, at least quite sufficient inconveniences to prevent me from adopting it; it does not at all prevent recurrences. The general and vague assertions that we have no recurrences after the subcutaneous injections, or that we have less than with other methods, are disproved by facts. I maintain that they are quite as frequent. At least this has been my experience in the trials I have made."

Vidal (ibid.) has seen patients submitted to this treatment return after a brief delay with most characteristic symptoms of syphilis.

In England, Hutchinson, who is *facile princeps* the leader of British syphilographers (and who in my opinion is, with the possible exception of Fournier, the leading syphilographer of the world), says, "Hypodermic injection has come but little into employment in English practice, nor does it appear to increase in favor with those Continental surgeons who at one time thought highest of it."

In this country Taylor, so far as I know, voices the prevailing sentiment among specialists in this branch when he says: "The extent of the literature of hypodermic injections in syphilis contributed within the past ten or twelve years is simply appalling, and there is really very little which is of practical value. It will be seen that almost every preparation of mercury has been experimented with in the hypodermic-injection treatment, and that the chemist's art has been sorely taxed to produce new preparations. Each new preparation has been exploited as the ideal of perfection, and in most cases a hearty welcome has been accorded it, so that a witty German reviewer has made the following paraphrase of an old maxim applicable to the subject: '*De novis nil nisi bonum.*'"

As to the injection of insoluble preparations he says he has no leaning toward its employment, and that he is firmly convinced that it will never be used as a systematic treatment extending over a period of years. He adds: "It is a treatment which is generally irksome and repulsive to patients, always attended with more or less discomfort and pain, and often producing destructive subcutaneous lesions over the body, which cause mental and physical suffering, and which of necessity must impair the patient's health and strength. In some cases, we have seen, it has been known to imperil and to destroy life."

In a more recent communication to the writer Dr. Taylor reiterates his preference for the bichloride as the best preparation for hypodermatic use, and states his belief, in which I cordially agree, that it is a method of "utility, exigency, and emergency." In the presence of intercurrent disease, as of influenza, he has found it most valuable, and has occasionally used it for long periods. He adds: "No importance should be attached to claims of speedy cure. They show that their sponsor knows little about the natural history of syphilis. The disease is chronic and far-reaching, and requires a corresponding treatment. Many men who have ransacked drug stores and importuned chemists for some ideal preparation of mercury, having got one to their notion, have used it for a short time, and seeing the prompt disappearance of existing lesions (which condition could be induced by the bichloride, bicyanide, and salicylate of mercury), have rushed into print and claimed marvelous and rapid cures. A thoughtful and experienced student of syphilis will only claim cures when the patient has undergone careful, watchful treatment for two years and more, and when, from the course of the case, he is satisfied that the disease has been brought to an end."

The soluble preparations he uses, as do most of us, under varying limitations, which will be presently discussed.

A review of the present position of the method in the hands of the American syphilographers shows a remarkable unanimity in the belief that hypodermatic medication is not destined to take the place of the other methods in the routine treatment of syphilis. The subjoined extracts from letters to the writer from the members of the American Association of Andrology and Syphilology, and from some well-known dermatologists, can not fail to be of interest at a time when the advocates of the method are rather trying to force it upon the profession. I have arranged them alphabetically:

Dr. L. B. Bangs says: "I instituted some experiments a few years ago in private practice and in my service at Charity Hospital, which satisfied me that the hypodermatic method of treating syphilis was so rarely useful as to be valueless. Moreover, the claim that it 'cures syphilis in a much shorter period, etc.,' will not hold, for, in my opinion, it takes just about so long to 'cure' the disease, whatever may be the method of treatment employed.

"The effect of hydrargyrum upon a symptom can be obtained by the other methods with no pain and with less risk than by the hypodermatic method."

Dr. W. T. Belfield, of Chicago, says: "I gave up the hypodermic medication of syphilis some time ago, because unable to convince myself of its advantages over less painful and more convenient methods of administration."

Dr. Charles F. Bevan, of Baltimore, says: "Regarding the hypodermic use of mercury in the routine treatment of syphilis my experience is not very satisfactory. The strong tendency to local annoyances, and the severe pain often experienced, are decided objections. I am inclined to believe the physiological effects of the drug may be produced somewhat more *quickly* than by oral ingestion, but are not more lasting. The absolutely curative effect by the hypodermic method in my hands has not been equal to that from other methods. It is a mode of treatment that should be reserved for some special and exceptional cases."

Dr. George Emerson Brewer, of New York, says: "My experience in the treatment of syphilis by the hypodermatic administration of mercurials has been extremely limited, owing to theoretical objections and a failure to discover any advantage whatever in the cases in which it was employed.

"My theoretical objection is that the daily dose which the patient receives is dependent upon the amount of absorption which takes place rather than upon the careful adjustment of the dose to each individual case."

Dr. F. Tilden Brown, of New York, says: "I have had no personal experience with the hypodermatic injection of mercury in the treatment of syphilis.

"I have waited for better assurances of its advantages, or positive assurances of its being a fair substitute, before making tests myself."

Dr. E. C. Burnett, of St. Louis, says: "Ever since the revival of Scarenzio's hypodermic use of calomel in the treatment of syphilis I have studied the reports from the advocates of this method, and I have been unable to convince myself that the results justify the use of it as a systematic mode of treatment of syphilis. Understanding that the employment of this method by its originator and those who came immediately afterward was first suggested by those severer cases in which the cutaneous application of mercury was contraindicated and the ingestion by the stomach unsatisfactory, I have always held this as a last resort to be used only under such conditions. During ten years of experience, both clinical and private, I have not as yet failed to relieve my patients, no matter how severe the phases of the disease, by the judicious management of the regular methods and with a minimum amount of discomfort to them.

"Aside from its possible utility under the conditions above mentioned, I can see no well-grounded reason for the employment of this method in the systematic treatment of syphilis. I believe such a use of it to be entirely unnecessary. I also believe that the claim that it cures the disease in a shorter time is unfounded, for why should the manner of the introduction of mercury into the system have an effect upon its ultimate therapeutic action when its physiological and pathological actions are known to remain the same?"

Dr. Charles McBurney, of New York, says: "I have been always well satisfied to administer mercurials by the mouth and by inunction. In my opinion, the danger of causing even serious disturbance in the connective tissue by injection is considerable, and I have known very disagreeable results to follow the application of this method. I can not believe that it has any advantage which can balance the dangers—if it has any advantages at all."

Dr. A. T. Cabot, of Boston, says: "I can not give you any personal experience on the subject, as I have never used mercurials in that way, having always depended upon inunctions and the administration by the mouth."

Dr. George Chismore, of San Francisco, expresses the same opinion.

Dr. P. S. Conner, of Cincinnati, says: "I have seen no results following injections in any respect superior to those following ordinary internal use of the iodides and mercurials, and have been so little pleased with the method that I do not employ it."

Dr. L. A. Duhring, of Philadelphia, says: "There seems to be but little to commend the practice, and a good deal, viewed from a practical standpoint, against its adoption as a mode of treatment for the average cases of this disease.

"I therefore would express myself as much preferring the methods by the mouth and by inunction."

Dr. J. A. Fordyce, of New York, says: "Some years ago, at Hot Springs, I instituted a comparison between the treatment of syphilis by hypodermatic injections and inunctions, and was so strongly convinced of the superiority of the latter method that I ceased to use injections.

"As a matter of routine, I at present give mercury by the mouth, or, when I desire a rapid effect, employ inunctions."

Dr. G. R. Fowler, of Brooklyn, says: "The method of medication in question has always seemed to me unscientific, or, to say the least, far fetched. It has never appeared to my judgment as a practical method when compared with that by the stomach and by inunction. It certainly involves some suffering on the part of the patient, and probably some dangers. I have yet to learn of sufficient advantages from its employment to compensate for its palpable disadvantages.

"It has not yet awakened in my mind sufficient enthusiasm to impel me to give it even a trial."

Dr. Algernon S. Garnett, of Hot Springs, says: "In my hands the hypodermatic treatment was abandoned for the following reasons: 1. The pain incident to the frequent use of the needle, and the accompanying inflammation due to the introduction of the mercury into the cellular tissue. 2. The uncertainty in regulating the *individual* dose. 3. The great difficulty in prolonging the treatment, where the tolerance of the drug is great, without perforating large areas of the skin.

"Where absorption by the skin and stomach has failed, this method might constitute the only safety for the patient, but such cases are rare and exceptional.

"My experience has been that patients too often get the local disturbance before the constitutional impression, and that the system has to be educated to the tolerance of a sufficient quantity of the drug if we would give protection for the future."

Dr. W. F. Glenn, of Nashville, says: "When Lewin first advocated this plan, I adopted it and used it considerably. My opinion may be briefly summed up as follows: 1. I found it very difficult to persuade patients to allow its use for any length of time, on account of the pain attendant upon the injections and the ulcers sometimes produced. 2. I did not think it proved more beneficial in ordinary cases than mercury by the stomach. 3. In malignant cases, where a quick, decisive action of the drug is desired, I believe inunction equal if not superior to it. 4. I have never seen the hypodermic treatment cure a case of syphilis in any shorter time than inunction or ingestion. 5. I believe that mercury given in any manner will require at least two years to accomplish the cure of syphilis, and in many a longer time."

Dr. Hingston, of Montreal, questions the value of mercury in syphilis, but says he sometimes prescribes it, and adds: "I then prefer it by the mouth, and more still by inunction. My experience in the employment of mercury in the form of hypodermic injection is extremely limited, but I am not disposed to give this latter form preference over the older methods, while its indiscriminate use in the routine treatment of syphilis is open to many serious objections."

Dr. James Nevins Hyde, of Chicago, says: "I can say but very little on the value of the hypodermatic injections of mercurial preparations in the treatment of syphilis, because of a limited experience. I have watched, with some care, the results of this treatment on the continent of Europe; I have also tested the method in both hospital and private practice at home. But with me it stands in the category of 'last remedies'; and in syphilis I do not have to recur to last resorts sufficiently often to know much about them.

"I am not a pessimist but an optimist in all questions relating to the treatment of that disorder. I have, as we all have, seen the most formidable damage done in cases where the expert, watching the course of the disease from the very beginning, has had neither time nor opportunity to avert the consequences by the best of treatment and the greatest skill. I do not believe that in the worst of these 'galloping' and 'precocious' cases, as our French brethren call them, even the most energetic treatment will avert the results.

"I also believe that the enormous majority of all our other cases do very well indeed under our present methods of safe and slow treatment by inunction, fumigation, and medication by the mouth. I believe that more than seventy-five per cent of our American patients, under the treatment of our best physicians, escape tertiary symptoms. I am therefore in no haste at present to exchange for a method which is not without danger, others whose success compares very favorably with that obtained in the scientific management of other ailments of the human body."

Dr. William Judkins, of Cincinnati, says: "My experience with the hypodermatic method of treatment of syphilis is by no means satisfactory. I could in no one case continue it long enough to have what might be called 'a cure,' as abscesses would invariably form at the point of introduction (causing many to take their meals standing).

"In one case, in spite of all known precautions, cellulitis followed, with suppuration, leaving a scar the size of a silver quarter. Fortunately, it is so situated that she rarely sees it, but the case, with others of less severity, decided me to abandon its use some time since.

"Considering the manner in which it was so highly commended, so much to be expected from its use, the results in my hands have been exceedingly disappointing."

Dr. Edmund E. King, of Toronto, says: "I have used hypodermatic injections very little. I believe their results to be misleading. I do not think it *cures*, but that in some cases it is a powerful adjuvant and brings the symptoms more rapidly under way, which permits systemic treatment a surer, quicker grasp on the case. I think, however, that it is a delusive treatment both to the doctor and the patient."

Dr. E. L. Keyes, of New York, says: "I do not think the hypodermatic use of mercury suitable for routine use in syphilis. I believe it impossible to '*cure*' syphilis by a '*short course*'—in this or any other method."

Dr. C. H. Mastin, of Mobile, says: "I can say, without the least hesitation, on that its use has never commended itself to my mind; that I believe its advantages have been *greatly overestimated;* that its inconveniences and dangers have not been fairly stated, and that it offers no advantages over mouth ingestion, or the method of inunctions. In a word, I have been and am opposed to its use, considering it an innovation, with no rational basis for its support."

Dr. Prince A. Morrow, of New York, says: "I do not recommend the hypodermatic method in the systematic treatment of syphilis, nor do I believe that it will ever supplant the classic modes of administering mercury. I look upon it as a *reserve* treatment, to be employed in exceptional cases; as, for example, when gastro-intestinal irritability is so marked as to forbid the introduction of mercury by the stomach, or where the necessities of the case demand a rapid and intense mercurialization to save important organs, etc."

Dr. H. G. Mudd, of St. Louis, says: "Personally I am not prepared to speak the value of hypodermatic injections in this way, for I have depended almost entirely on inunctions and the internal administration of mercury in the systematic treatment of syphilis. Without having had much experience I have been rather afraid of hypodermatics of mercury."

Dr. W. K. Otis, of New York, says: "I desire to express myself as decidedly opposed to the treatment of syphilis by means of hypodermatic injections of mercury in any form.

"1. Because I believe that the patient can be brought under the mercurial influence more safely, comfortably, and satisfactorily by other methods.

"2. That it is unsafe, for, should symptoms of salivation appear, it is impossible to withdraw the drug, it being beyond control the moment it is injected.

"3. That this method is more uncertain in its effects.

"4. A certain amount of danger of producing abscess.

"In regard to the assertion that this method 'cures' syphilis in a much shorter period than others, it seems to me that only a very large experience, extending over a period longer than this method has been in existence, would establish this fact clinically, while theoretically I am inclined to doubt that such is the case."

Dr. E. R. Palmer, of Louisville, says: "I am absolutely without personal experience in the hypodermic treatment of syphilis, but have watched the subject-matter sufficiently to fully convince myself that there is nothing in it."

Dr. Roswell Park, of Buffalo, says: "I have never resorted to hypodermic use of mercurial preparations as a routine treatment. I have adopted this method only in severe cases, or those where symptoms were of speedy occurrence and seemed to call for the liveliest possible impression, or in rare instances where the system was intolerant of other methods.

"The method has never seemed to me one which would commend itself—in this country—or one which could rationally be expected to find general adoption either among the profession generally or the laity. I have no personal experience as to whether it can 'cure' or is capable of curing syphilis more quickly than other methods."

Dr. A. W. Stein, of New York, says: "I employed the hypodermic method at Charity Hospital years ago on a series of cases, and discontinued it because I saw no appreciable difference from the other methods of treatment."

Dr. Henry W. Stelwagon, of Philadelphia, says: "Some years ago while studying in Vienna, the method of treating syphilis by hypodermatic injections was being extensively practiced in the General Hospital, more particularly in Sigmund's wards. I was impressed with the cleanliness of the method and also with the exact measurement of dosage thereby made possible, but its evident disadvantages, such as pain at the point of injection, sometimes lasting several hours or days, with often the production of an inflammatory cherry to walnut sized, deep-seated swelling, and not infrequently abscess formation, completely overshadowed, in my judgment, its few merits. In the light of experience, bearing the above observations in mind, I believe that an existing eruption may be made to disappear more rapidly by this method, but doubt very much that it has any advantage as to permanence of effect. In my own practice, covering about ten or twelve hundred cases of cutaneous syphilis, I have never felt called upon to go beyond the methods of treatment by mouth ingestion and inunction—except in one instance, a young man with a marked syphilitic cachexia and a malignant general large pustular syphilide, whose stomach rebelled against the drug, whose full digestive power was needed for nutritive repair, and whose condition of skin necessarily precluded the method by inunction."

Dr. F. R. Sturgis, of New York, says: "It is many years since I have used the hypodermic injection of mercury in the treatment of syphilis, and my reason for abandoning it was the great pain it caused, and the tendency which it had to produce abscesses in the cellular tissue. Indeed, the pain was so great that the charity patients at the hospital ran away rather than submit to the treatment. That it was in many cases efficacious I have no doubt, but I do not think that the advantages outweighed the pain, nor was its action any more certain and lasting than when mercury was given by other methods. I am very doubtful, indeed, if it cures syphilis in a much shorter period than when given by the mouth, or inunction, or fumigation, although in some cases it caused the symptoms to disappear a little more rapidly perhaps than they would have done under other circumstances. The preparations used were the bichloride, which was excessively irritating; then afterward calomel, which was less so; and, lastly, the albuminate, which seemed to be the best borne of any; but, as I say, I have not used it for many years, and think its use, certainly in private practice, is restricted."

Dr. James P. Tuttle, of New York, says: "My experience is confined to the use of the mercuric chloride, having never used any of the other salts by this method. In cases where an exceedingly rapid mercurial impression is necessary, I have found it the most prompt and effective method of administering the drug. I have never relied upon it alone for a cure, having always continued the use of the drug in tonic cases by the mouth, for some months afterward. The rapid subsidence of cutaneous and other symptoms of the disease through this method have been very gratifying to me and impressive to my patients. The pain which it produced is the only objection which I have found to it. I have never seen an abscess nor a permanent induration follow one of these injections. I believe the secret of this lies in the use of sterilized needles and solutions, in injecting deeply into the muscular tissues, and in massaging the parts for five minutes or so to promote absorption. My experience is limited to fifteen cases in all, perhaps two hundred injections, but, small as this is, it has been altogether favorable. That the method will ever supersede oral ingestion, inunctions, or baths, I do not believe; but in well-selected cases, where rapid effects are demanded, I believe it not only most useful but reasonably safe treatment for syphilis."

Dr. Arthur Van Harlingen, of Philadelphia, says: "About eight to ten per cent of the skin cases coming under my notice are of syphilitic origin, and the majority of them are light or of moderate severity and yield readily to the ordinary remedies given by the mouth. In some semimalignant cases I have found the hypodermatic use of mercury to succeed where the employment of mercury and other drugs by the mouth has failed. I regard this method, therefore, as a useful adjuvant to the ordinary modes of administration. I have never found any danger or serious inconvenience from the use of mercurials hypodermatically. I almost always use the bichloride. I have, however, tried several other preparations on a small scale, but without much satisfaction. In my experience the hypodermatic treatment of syphilis does not remove the lesions more rapidly than the ordinary treatment by the mouth, nor does it insure against relapses any more than the ordinary treatment does. I should never recommend its use as a routine form of treatment in average cases."

Dr. John Blake White, of New York, contends that no time should be lost in getting the patient under mercurial influence, and adds: "The syphilitic poison, like that of tuberculosis, affects more especially the glandular system, and the lymphatics are consequently slow to take up and utilize medicine taken by the mouth; therefore we must hope to affect the general system more surely and speedily through hypodermatic injections, the advantages of which I do not believe are exaggerated.

"As to 'curing' syphilis by this method, I am convinced that at least as much toward this result is effected by the hypodermatic method in a far shorter time, more surely, and as safely as by the administration of remedies per orem or by inunction."

Dr. W. N. Wishard, of Indianapolis, says: "I have not been sufficiently impressed, from my reading of the published experience with this method, to lead me to try it, and have consequently had no experience with it."

I must confess that I attach much importance to the foregoing opinions and practice of my colleagues in that society, composed of the leading syphilographers and genito-urinary surgeons of this country. I know them to be intelligent, alert, and ever on the lookout for anything that can improve their results as regards the comfort or the safety of their patients. Their views, and the opinions of such men as Fournier and Hutchinson, who stand in the front rank of syphilographers not only of to-day but of all time, far outweigh with me the one-sided statements, hasty generalizations, and untrustworthy reports of results which constitute so large a portion of the literature of hypodermatic injection. I do not mean to deny that there are men of great eminence and undoubted scientific ability who are among its advocates, but if we look for them among those who give it first place in the treatment of syphilis, they are relatively so few that they are lost among the seekers for novelties and the untrained and inaccurate observers who come to the front in such large numbers whenever an opportunity like this occurs.

I offer no apology for the extensive citations I have made, as the question is a live one, and every practitioner who undertakes the treatment of syphilis—and who does not?—is interested to know the exact status of the method at the present day.

In the light of the evidence presented above it seems to me safe to assert that *the hypodermatic treatment of syphilis has not as yet shown results which warrant its adoption as a routine method to the exclusion of or in preference to other methods, but, on the contrary, has some apparently insuperable disadvantages and even dangers which render it improbable that it ever will be so adopted.*

2. The circumstances under which hypodermatic medication should be employed may be summarized as follows:

(*a*) Those cases in which other methods of treatment have been tried and failed. (*b*) Those cases in which, owing to idiosyncrasy or intercurrent disease, the skin and the digestive tract can not be used for the introduction of mercury. (*c*) Those cases in which, owing to grave and advancing lesions, rapid mercurialization is absolutely necessary. (*d*) Those cases in which obstinate localized lesions can be most directly reached by this plan. (*e*) Possibly those cases, referred to by Jullien, in which early differentiation between syphilis and malignant disease, or tubercular ulceration, is extremely important, should be included in this list. I certainly feel inclined to employ the method in all doubtful cases which admit of it, particularly in those conditions of the tongue which often leave the surgeon for a considerable time in doubt as to their exact nature. Anything which promises to shorten this period of doubt by rendering the therapeutic test more rapid and more certain would be of great advantage. I should, however, in such instances feel obliged to use potassium iodide by the mouth at the same time. (*f*) A theoretical possibility of the use of mercury hypodermatically has suggested itself to me, but I have not as yet actually employed it. It may be that its use by this method will aid in shortening the period of doubt which often intervenes between the appearance of the primary sore and the development of general adenopathy or of the exanthemata. If in the presence of a sore of uncertain character the employment of mercury hypodermatically resulted in exceedingly rapid cicatrization, no local treatment being employed other than cleanliness, it might occasionally throw light upon the case without being open to all the objections which attend the systematic and slower administration of mercury by the mouth (see p. 716). It is possible that the idea is worth a trial in exceptional cases, but I do not think it should be adopted as a routine practice for the reasons which have already been given in the section on the so-called abortive treatment of syphilis.

3. As to the choice between the two great classes of mercurials, the soluble salts are to be preferred to the insoluble in the large majority of cases, as more exact in the matter of dosage and much less dangerous, and

less likely to be followed by local disturbances. They are always to be used when there is need for rapid mercurialization.

The insoluble salts should probably be reserved for those cases in which frequent visits to the surgeon are impossible and in which no contraindications exist. In cases of defective kidneys, diabetes, profound anæmia, marked atheroma, great debility, etc., such methods are dangerous, and the case, even if urgent, will probably do better under some other form of treatment.

4. Finally, as to the special preparations to be employed:

Among the soluble salts the bichloride is probably to be preferred. The results from its use are not strikingly different from those obtained from the other compounds of this class, but its stability and great solubility and its germicidal qualities seem to warrant its selection. The disadvantage is the pain which it causes, but the evidence in this direction shows that in the hands of impartial investigators, not responsible for the introduction of the particular substance employed, each of the salts on the list produces a considerable amount of pain and a not inconsiderable number of accidents or complications. Probably the bichloride is freer from objectionable features, in respect especially to the production of suppurations, than any of the salts of mercury.

Among the insoluble salts, calomel and the yellow oxide are perhaps to be preferred. It would appear that the latter is a little less active, but at the same time much less irritating. Gray oil is the most available form of administering metallic mercury.

4. **Vaporization.**—This method, as applied to the general systematic treatment of syphilis, is now very rarely employed. I at one time made arrangements with the proprietors of some Turkish baths in Philadelphia so that my patients could be given a mercurial vapor bath on my prescription, but the time it required, the degree of publicity involved as regarded the bath attendants, and the lack of any evident superiority over other methods, resulted in its almost entire disuse in my practice. There are, however, cases, as of dense, small, widely distributed papular or pustular syphilides, in which the whole area affected could not well be reached by inunctions, but in which the mercurial vapor bath acts with remarkable efficiency.

The drug to be preferred is calomel. The average dose is thirty grains. Cinnabar, the iodides, and other mercurial preparations have been used, but have no advantage over calomel. Various apparatus have been devised for the purpose of administering mercury by vaporization. That of Henry Lee is an alcohol lamp surrounded by a wire screen and surmounted by a little saucer-shaped dish in a sort of water bath. That of Maury, of Memphis, is more elaborate. I have always found it easy to have the patient extemporize a stand for the calomel by converting a piece of sheet tin into a table, bending over the ends at right angles, making two uprights of sufficient height to permit an alcohol lamp to be slipped beneath the central portion, on the top of which the calomel is placed (Keyes); or I have a tinsmith make a little tripod carrying a small saucer.

This apparatus is placed beneath a cane-bottomed chair, on which the patient sits naked, but with an ordinary blanket pinned around his neck and descending to the floor tentwise, covering in the chair. I have never found it necessary, nor do I believe it important, to make any provision for the production of steam at the same time. The warmth produced by the alcohol lamp will soon excite a sufficient perspiration to make the calomel vapor adhere to the surface of the body. Violent sweating by washing it off defeats the object of the bath. Twenty minutes may be spent with the lamp burning, and ten minutes to cool off in after the lamp is extinguished. Rest in bed for a couple of hours afterward, or for the night, is to be advocated.

I do not know of any one who is now using the method of vaporization in the systematic treatment of syphilis.

In my practice I have only employed it when the other plans had failed, or when a small, hard papular or pustular syphilide, or obstinate precocious ulceration was present. It is then invaluable. It is well to have some one with the patient, or at least within call, when these calomel vapor baths are being used, as the heat and the fixed attention sometimes produce syncope, and there might be danger of ignition of the blankets and serious injury.

The local use of this method will be described in the section on the treatment of special lesions (see p. 803).

5. **Mercurial and Thermal Baths.—Heat.**—As a method for the treatment of general syphilis *mercurial baths* have been but little employed and present few advantages. Warm baths containing varying quantities of sublimate in solution have been recommended in some of the emergencies of syphilis, but can only be regarded as an uncertain and doubtful adjuvant to or substitute for other and more exact methods. They are occasionally of value in the treatment of widely diffused and obstinate syphilides, especially those attended with ulceration or pustulation. In such cases a bath in 1 to 50,000 sublimate solution may be of great use, not so much as a means of mercurializing the system, but rather for the sake of the direct effect upon the local lesion. The benefit of this is unquestionably increased by the antiseptic properties of the salt, which aid in overcoming not only the specific infection (syphilis bacillus) but also the pyogenic (staphylococci) infection which keeps up the suppurative or ulcerative process. Thus Ehrman (Archiv für Derm. und Syph., Bd. xxii, Heft 6, 1890), while objecting to

the employment of mercurial baths for the treatment of constitutional syphilis, on the ground that it is not possible to introduce in this way sufficient mercury into the system, highly commends this means of treatment in local manifestations of the disease. In papulo-pustular syphilides, papular and ulcerative forms of the disease, ulcerating gummata, and moist papules, the baths are most serviceable, particularly in cachectic patients, who do not well support a vigorous mercury treatment. The tubercular eruptions and gummata involving the skin also heal under this method of treatment.

Where certain regions of the body are involved partial baths are recommended: thus, in manifestations upon the genitalia the sitz-bath is useful; and in plantar or palmar psoriasis, or syphilitic onychia, the hands or feet alone may be submerged.

Finger recommends highly in the pustular and ulcerative forms of the disease the following method: He dissolves two drachms to one ounce of the bichloride in water and adds the whole to a bath having a temperature of 78° to 80° F. This temperature should be maintained by the addition of hot water, while the patient remains in the bath for from one half to two hours. This is repeated daily, and should be followed by an hour in bed. If the lesions are only upon the limbs, an arm or foot bath will be sufficient; for this, one drachm and a half to three drachms should be used. The absorption of mercury by this method he believes to be considerable, and the local action upon the lesions to be of great advantage.

Thermal baths, especially those at the various natural hot springs in different parts of the world, have been employed by thousands of syphilitics, and still have a great vogue. In this country the Hot Springs of Arkansas, abroad those of Aix, are the best known and most frequented. The general opinion of the profession is that the waters of these springs have no special remedial value, and that hot salt-water baths at the seashore, or even hot tub baths at a wholesome mountain resort, would be equally useful to the patients who derive the most benefit from the springs. That is certainly my opinion, and I have never seen or heard anything that makes me doubtful as to its correctness. The patients who should be sent to the springs belong to one or the other of the following classes:

1. Patients whose mode of life is objectionable, and who can not be controlled while under home or other customary influences. This includes not only the large class of hard drinkers, who are apt also to use tobacco too freely and to indulge in various other excesses, but also the much smaller class whose excessive devotion to work or business interferes with their general health and lessens their strength and vitality.

2. Patients whose symptoms resist full doses of the specific drugs, and who are unable to take larger doses without a breakdown of the digestive

apparatus, or the production of mercurial or iodic intoxication. Those especially should be sent who have involvement of the viscera, and still more particularly if the brain or spinal cord is affected.

3. Patients who with syphilis have intense syphilophobia, and require the mental impression and in addition the tonic influence of change of scene and climate.

4. Patients with defective elimination or with marked idiosyncrasy as regards either mercury or the iodides.

Although this seems a rather broad and comprehensive list, it must be remembered that I am not advising that all patients who belong to these classes should be sent to the springs. I am merely asserting that those patients who will derive the most marked benefit from them will be found in one or the other of the above groups. The routine method of treatment employed at the various springs demonstrates that the very competent physicians who are usually found there do not depend upon the waters for their cures, but, aided by them, give an even more active course of mercury and the iodides than is customary in private or hospital practice. I have already described the method employed at Aix (see p. 757). That in use at the Hot Springs here is somewhat similar. The most successful of the local practitioners use large doses of mercury by inunction, and, if the symptoms call for it, equally large doses of the iodides. Fordyce, who resided there for three years, makes the following interesting remarks as to his observations in from ten to thirty cases daily:

> As the majority of these patients used both the hot baths and some form of mercurial treatment, it is difficult to estimate the relative value of each. Occasionally, however, I would see a patient who, either through excess of faith in the hot water or from fear of mercury, would bathe in and drink of the water, without other treatment, for a period of several weeks or months. I have observed such patients both before and after a prolonged use of the baths, but in none of them have I been able to detect any change in the disease which could be attributed to the water. As soon, however, as a mercurial treatment was commenced, improvement would begin and continue.
>
> Many patients come to the springs after a prolonged mercurial course at home, laboring under the impression that their system was full of mercury, and hoping by the use of the hot water to "boil it out." Patients of this class have developed ptyalism after a number of baths, thus supporting the common opinion that the waters have an influence in eliminating the drug. This effect is probably due to the increased capillary circulation, favoring tissue change, and greater activity in the elimination of matter foreign to the tissues. Individuals who come from a malarious district, though having suffered no acute outbreak for years, often, after bathing for one or two weeks, develop some form of malarial fever; gouty subjects, too, after hot baths frequently have an acute outbreak of their trouble. These phenomena are well known to the bath physicians as every-day occurrences. It is observed, also, that new

growths, especially those of a malignant character, take on increased activity of development after the use of the hot baths, so that it is a matter of common report at the springs that persons affected with cancer should not use the hot water.

It would be quite rational to suppose that the increased tissue change which hot baths are known to produce could be utilized to advantage in combating a new growth of such unstable character as the neoplasms of syphilis; and, in fact, the last stages of the disease seem to be especially benefited by the use of the baths in connection with specific remedies. How much of the cure depends upon the increased power of digestion and assimilation caused by the change of air, scene, and diet, and how much on the baths, is difficult to say. I have seen, however, patients in a profound state of cachexia from old syphilis improve rapidly at the springs—patients who had been in charge of competent physicians at home, and who had taken mercury and iodide of potassium to the limit of tolerance.

Whatever theoretical considerations may be brought forward, experience shows that many cases of late syphilis are more quickly cured at the springs than at home. I have never, on the other hand, been able to convince myself that the early stages of the disease were more rapidly cured there than under the inunction method at home. Still, as many patients are unable to carry out this method of treatment, or are under the care of physicians who do not appreciate its importance in producing rapid relief, or understand its technique, the comparison which the patients make between the relief obtained at home and at the Hot Springs results in favor of the latter, and to the springs is given the credit which should belong to the method of employing the drug. The liberal use of hot water internally and in bathing undoubtedly increases the activity of the organs of excretion, possibly enabling the patient to tolerate the drug in larger quantities. Ptyalism and irritability of the gastro-intestinal canal, however, frequently occur, necessitating a cessation of all medication. I recall now two cases of death from the use of large and long-continued doses of the iodides —one from gastro-intestinal inflammation, the other from heart failure. It is not claimed by the bath physicians that relapses are prevented by a course of mercurial inunctions; on the contrary, the patients are told to continue the use of mercury on returning home, and when practicable to return again in a year or two. Many patients anticipate such relapses by annual or periodical visits.

The beneficial effects of the hot baths are probably as much overrated by the bath physicians as they are often underestimated by the physician away, self-interest in both cases modifying the advice given.

These remarks represent a fairly conservative, and I believe a just estimate of the value of the springs. They are, in the main, concurred in by American syphilographers.

Lustgarten (Annual of Univ. Med. Sci., 1891, F. 43) has expressed practically the same views as regards the Continental resorts. He states that the chief therapeutic benefit derived from the springs is the hot bath itself. These baths accelerate elimination by mechanically removing epidermis, and, by producing a more active circulation of the skin, facilitate the absorption of mercury.

The sulphur baths do not differ in their action from those of indifferent springs. The chloride-of-sodium and iodine-brine baths seem, however, decidedly to increase oxidation.

Fournier particularly advises hot baths during the intervals of syphilis. He thinks that much of the advantage derived by patients from visiting baths is no doubt due to climate, and adds: "When, in spite of rational treatment, relapses occur in quick succession; when the disease assumes a malignant form, and the patient becomes intolerant of specific medication; when there is marked and obstinate involvement of the bones, glands, or nervous system, or when mercurial cachexia is developed, the sulphur and salt springs may accomplish good results."

The subject should not be dismissed without mention of the danger which is incurred by many syphilitics from overconfidence in the healing virtues of the Springs. This leads them, after a short sojourn there, during which their symptoms disappear, to imagine that they are entirely cured and to neglect subsequent treatment, thus substituting for the prolonged course which they require a short and heroic treatment, which in this, as in the case of hypodermatic medication, is to be unsparingly condemned. I have had many such patients who came to me with late phenomena, and who were disposed to feel themselves ill-treated or defrauded in the lack of the "cure" which they had confidently expected. Sometimes their expectation has been due to the ignorance of medical advisers who sent them to the springs with a far too flowery description of the resulting benefits. Oftener it arises, as I have said, from the ignorance of the patients. I have no reason to believe that the theory of rapid and permanent cure receives any support from the physicians who practice at the springs.

The general subject of the use of *hot baths* in the treatment of syphilis has been investigated by Borovski (Journ. of Derm., 1889, vol. ii, p. 22), whose conclusions (commended and quoted by Taylor, *op. cit.*) are as follows:

> The clinical observations were made on twenty-eight syphilitic patients. Heat was employed in the form of (*a*) ordinary hot-water baths at 98° to 104° F., of thirty minutes' duration; (*b*) artificial sulphur baths (prepared by adding one pound of sulphur to each bath) at from 100° to 104° F., of from twenty to thirty minutes' duration; and (*c*) hot-air baths at from 180° to 200° F., of from fifteen to thirty minutes' duration. Dr. Borovsky's results may be summarized as follows: 1. Both tepid and hot-water baths, as well as those of sulphur and hot air, invariably increase the elimination of mercury in the urine. 2. The elimination proceeds more energetically the higher the temperature to which the patient is exposed. 3. The cause of such intensified excretion of mercury should be sought in an increase of the systemic metabolism, accompanied by the disintegration of mercurial albuminates. 4. A mercurialized patient's organism actually can be completely freed from mercury by means of a systematic employment of heat in one form or another. 5. In such cases, when the

elimination of mercury ceases spontaneously, it can be made to reappear by the use of hot baths. 6. Mercurial stomatitis can be cured by heat more quickly than by any other means. 7. Hot-air baths, while inducing an enormous perspiration, promote the elimination of mercury also through the sweat-glands. The total quantity of sweat excreted during a bath amounts to four hundred cubic centimetres and more; that of mercury in the sweat to 1·6 milligramme and more per four hundred cubic centimetres. Hence, as a means for freeing the patient's system from mercury they should be preferred to all other baths. 8. The appearance of mercury in the sweat naturally suggests that diaphoretics generally are useful adjuvants in the treatment of mercurialism. 9. Tepid baths (88° F.) should only be resorted to in cases of hydrargyrosis in which higher temperatures are contraindicated on some grounds. 10. Hot-air baths are borne by patients better than hot-water ones (98° F.), which sometimes give rise to fainting. 11. Hot-air baths at 170° or 180° F., of twenty minutes' duration, were borne better than those at from 140° to 160° F., of thirty minutes' duration, while the physiological and therapeutical effects of the former are practically identical with those of the latter. 12. In persons having an idiosyncrasy against mercury the employment of heat sometimes affords the possibility of safely continuing mercurial treatment. 13. Hot-air baths, while inducing intense thirst, involve an increased ingestion of fluids, which in its turn leads to an increase in the bodily metabolism. 14. As regards the elimination of mercury from the organism, artificial sulphur baths do not offer any advantages whatever over other baths. 15. The time required for the complete excretion of the metal from the patient's system varies according to the total amount ingested, individual peculiarities of the patient, temperature of the baths, etc. 16. A simultaneous treatment of syphilis by mercury and heat may sometimes effect a cure more quickly than a mercurial treatment alone. 17. The heat treatment alone (one or two baths daily for a fortnight), however, usually proves powerless to bring about a cure. 18. In patients with diseased vascular system the use of hot water requires great caution.

Kalashnikoff (Brit. Jour. Dermatology, November, 1889) observed on thirty-one patients the effect of heat applied to the surface. In cases in which there were widespread syphilides the most affected limb of the patient was placed in a hot bath (115° F.) for half an hour twice daily. During the intervals warm compresses were kept wrapped about the parts. Where the lesions were in such portions of the body that baths were impracticable, hot fomentations, or the hot-water bag (111° to 122° F.) were applied for an hour twice daily, the treatment during the intervals of application being the same as before. In one group no mercurials were used; in the other, inunctions or injections of mercury, with or without the iodide of potassium, were employed. Kalashnikoff's conclusions are: 1. Heat, applied locally, powerfully promotes the resolution of syphilides in the region treated. 2. Syphilides of all kinds disappear more rapidly under the influence of heat than under that of a mercurial treatment. The primary indurated sore is resolved in from eight to sixteen days without leaving any sclerosis; roseola and papular erythema in from four to eight days; papules and superficial impetiginous syphilides in from eight to twenty-one days; nonulcerating tubercles and gummata in from seven to twenty-four days; ulcerating ones become cicatrized in from one to six weeks; periostitis disappears in from one to twenty-four days; osteocopic pains subside in from three to eight days. Commensurate with these local changes, the patient's general condition is markedly improved. 3. By the use of heat and mercury a more rapid absorption is promoted than by the use of either agent alone. 4. In cases of relapse the comparative immunity of parts treated by heat is striking. 5. Heat is especially indicated in such obstinate condylomatous lesions as refuse to yield to mercury or iodides. 6. Heat is contraindicated in those whose weakness is so great as to render dangerous the necessary mechanical disturbance, and in case of moist papules where dusting with calomel will be found more satisfactory.

General hot baths (106° F.) of ten or fifteen minutes' duration act favorably upon syphilitic manifestations, especially when followed by packing in woolen blankets.

Usass has, to an extent, confirmed the accuracy of these conclusions, while Fisher argues that syphilis can be actually cured by heat.

Tarnovsky (Vratsch, St. Petersburg, 1889, Nos. 5, 9), while admitting that local applications of heat will cause rapid disappearance of the syphilides, states that after this treatment the disease is peculiarly prone to attack the viscera, producing exceedingly grave lesions. Hence, the latter repudiates the treatment of syphilis by heat.

Stepanow advises the use of warmth by means of rubber bags filled with water as hot as the hand can bear, and claims that—

1. It should have a valuable place in the treatment of skin manifestations. 2. Healing follows every application of heat more quickly than any other method, the operative excepted. 3. Syphilitic and nonsyphilitic indurations soften by the application of heat. 4. It operates by increasing the function of the skin, the blood-vessels, and the food supply. 5. It tends to remove blood-stasis and to relieve pain.

Electric baths have been recommended and employed by various observers.

Kronfield (Wien. med. Woch., July 25, 1889) describes an electric bath so constructed that the tub in which the patient lies is divided into two compartments, the water in each being separated, so that a current of electricity carried into one can be transmitted into the other only through the patient's body. When these compartments are filled, a powerful stream of electricity may thus be utilized for the purpose of causing absorption of mercury. On the basis of numerous experiments and examinations of urine, it was found that by means of these electrical baths, about three drachms (11·66 grammes) of bichloride of mercury being added to each, the rapid absorption of the medicament could be brought about, and, as a consequence, there was a disappearance of specific symptoms.

Gaertner and Ehrman also warmly commend sublimate electric baths. Examination of the urine showed that there was rapid absorption of mercury. They conclude that the amount of the drug absorbed is proportional to the strength of the current and the length of time during which its application is continued. They also believe that accurate dosage is possible.

The *elimination of mercury* from the system has been carefully studied by Lindén (Finska Lakareska elekapets Handlingar, p. 191, 1892), who found that electrolysis showed the presence of mercury in the urine, two to two and a half hours after injections of mercurials—that is, during the time required to excrete three hundred cubic centimetres of urine. It increased rapidly in amount for the first twelve hours, then remained the same during the first and second days. The quantity eliminated then gradually diminished, some remaining present till the end of the first or beginning of the second week. After repeated injections the amount in the urine increased rapidly till the third or fourth day, and diminished till the end of the first week; during three or four weeks a slight quantity is found, but this entirely disappears at the end of two months.

The elimination and appearance in the urine is slower when either the skin or alimentary tract are used as means of approach.

Schuster (Journ. of Cut. and Gen.-Urin. Dis., vol. i, p. 353) found that mercury introduced through the skin or in any other way is irregularly eliminated by the urine, but regularly and completely by the fæces; that this elimination, after extensive courses of inunction, is complete in about six months; and that, accordingly, persistence of mercury in the organism—the *bête noir* of many of the laity (see p. 726) and of some practitioners—does not occur.

The Use of the Iodides in Syphilis.—Since the publication of Wallace's observations at the Gervis Street Hospital, Dublin (1834), as to the value of potassium iodide in syphilis, and the later writings of Ricord and Trousseau, the iodides have had a place in the treatment of syphilis only second to that occupied by the mercurials.

The *rationale* of their action is not so clear (see p. 738); but it is certain that it does not depend, as was once thought, upon their influence on the residue of mercury left over in the tissues from a previous mercurial course, and rendered soluble and potent through the presence of iodine.

The observations of Melsens and Guillot, long quoted in support of this view, have recently been contradicted by Suchoff (Vratsch, 1886, vol. vii, p. 840), who asserts that the administration of the iodides really retards the elimination of mercury.

Further, it has been shown, on the one hand, by Schuster and others (see *supra*), that by the unaided processes of Nature mercury is completely eliminated from the tissues in a period of about six months after its use is discontinued, and, on the other hand, that in appropriate cases, even when there has been no previous mercurial course, the iodides exercise their usual beneficial influence.

The old statement that "mercury cures, iodine relieves syphilis," may come to have a scientific foundation through modern bacteriological research; viewed as a germicide, the former is incontestably superior; and this probably explains its far greater value in the earlier stages and the comparative inefficiency of iodine during that period. Although I believe this to be a well-established clinical fact, there is some diversity of opinion about it, based upon the alternative theories which regard iodine (*a*) as a direct specific, and (*b*) as a promoter of the absorptive and eliminative processes.

If the former view were correct, it should certainly be employed oftener and more freely in the secondary stage than is at present the custom. Many general practitioners do so use it, but as a rule they are not of a class whose ability or experience carries much weight. I think most syphilographers would agree with Hyde, who says (Therapeutic Gazette, March 15, 1889) that "a coarse test of any physician's expertness in the management of the disease is to be found on his use of the iodides; most general practitioners hastily employing them at a time when the specialist finds no indication for their use." The views of those syphilographers who hold the opposite views have been summarized by Mauriac, who says that though the action of the iodides may be less rapid than that of mercury, it is deeper and more durable, and is useful in those accidents that are graver, more destructive, and less liable to heal spontaneously; their sphere of action is therefore much greater than that of mercury, and their relative harmlessness is a great advantage. According to him, the indications for their employment are: (1) The phagedenic forms of the initial lesion; (2) in the beginning of the secondary period especially to combat the fever and headache; (3) in the erosive and ulcerative syphilides; (4) in all the syphiloderms of transition, the papulo-squamous and papulo-tuberculous; (5) in all tubercular and all malignant syphilides; (6) in all subdermic syphilitic manifestations, in gummata or gummatous exudates that break down and ulcerate.

On the other hand, Sigmund, though he sometimes uses the iodides in combination with mercurials, or alone in the milder syphilitic manifestations, as erythema and papillary eruptions with general lymphatic involvement, does not think it possible that they can replace the mercurials, and usually reserves them for employment in very marked general lymphadenitis, in scrofulous constitutions, in rheumatoid diatheses and headaches, accompanied or not by loss of sleep; in unfavorable hygienic or dietetic conditions, in diseased conditions of the gums and teeth, and in general in all those conditions in which the idiosyncrasies of the patients or the constitutional complications contraindicate the use of mercurials.

Finger believes in the combined use of the iodides with the mercurials, in the later stages of the syphilitic treatment, when, he thinks, they are superior to the mercurials; but Neumann often uses them in the mild relapses of the secondary stage and in those of the tertiary, reserving the mercurial treatment, in the form of inunctions, preferably for the severer manifestations of both periods. He considers the iodides especially useful in periostitis of the joints, muscles, or synovial sheaths of tendons, and in the tertiary affections of the eyes and internal organs, when he uses mercurial inunctions also.

I have thought it well to indicate these slight differences of opinion and custom, although I believe that the value of the iodides is so little in an ordinary case of secondary syphilis that it is more than counterbalanced by their irritant effect upon the gastro-intestinal mucous membrane.

Moreover, Taylor asserts (*op. cit.*, p. 68) that he has many times seen syphilitic infiltrations in the skin and mucous membranes have their starting points in inflammatory foci, caused by the iodides.

As a rule their therapeutic value increases in a direct ratio with the age of the syphilis. I would accept, however, some of the indications mentioned by Mauriac, and believe that even in early syphilis the iodides should be added to the mercurial treatment whenever extensive and dense exudation has occurred, whether in the deeper layers of the derm, in the subcutaneous connective tissue, in the periosteum or bone, or in the viscera. In these precocious phenomena their influence is but little less useful than in the same conditions seen later in the disease.

The routine use of the iodides has already been sufficiently described (see p. 738). I may add here that, though they have sometimes been abused and are often given in unnecessarily large doses, I still think that the old rule of measuring the required amount by the effect upon the symptoms is a useful one. It leads occasionally to the administration of enormous doses, to be sure; but if the case is at all a serious one, and if the diagnosis be assured, the effects of the drug are not to be compared in possible gravity with those of the disease. Used in this way the practitioner will often be gratified to find the iodides finally causing the disappearance of obstinate osteocopic pains or violent cephalalgias, the resolution of large and threatening gummatous swellings, the subsidence of periosteal nodes, the cicatrization of enormous ulcers, the return of power to paretic or paralyzed muscles, the cessation of epileptiform convulsions, and even the re-establishment of the mental faculties after they have been persistently and to all appearance hopelessly disordered.

There is nothing more satisfactory in therapeutics than the direct and unmistakable benefits following the administration of the iodides in such cases.

In doubtful cases, for diagnostic purposes, large and increasing doses may also be given, sometimes with the result of promptly revealing the specific character of the lesion requiring treatment. It must be remembered, however, that other obscure conditions than those resulting from syphilis may be benefited by full doses of the iodides, and a faulty diagnosis and prognosis may be the outcome of a too implicit dependence on the "therapeutic test." Still more dangerous, in my opinion, would be the acceptance of the rule formulated by Jullien and H. C. Wood. The former asserts that "the existence of syphilis contributes powerfully toward producing tolerance of the iodides. Experience proves, in fact, that in persons free from this poison the toxic phenomena of iodism are much more to be dreaded. In the same manner an antidote may be dangerous, or even fatal, when the organism is not under the influence of the poison which it is intended to combat."

The latter says: "In all cases of doubtful diagnosis the so-called therapeutic test should be employed; and if sixty grains of iodide of potassium per day fail to produce iodism, for all practical purposes the person may be considered to be a syphilitic."

These statements, if well founded, would convey an important practical lesson of the greatest value in the diagnosis of obscure conditions suspected to be of syphilitic origin. If unfounded, they may be seriously misleading. Dr. Wood contents himself with the simple statement of what he believes to be a clinical fact, confirmed by his experience in large numbers of cases of disease of the nervous system. Jullien, in addition to appealing to experience, advances the theory that iodide-poisoning resembles the overaction of an antidote in the absence of the poison for which it is administered. He appears to think that this offers a satisfactory explanation of the circumstances. They agree essentially in the statement that in doubtful cases the failure to produce iodism by large doses of the iodides may be considered to point strongly toward the existence of syphilis.

The question is certainly one in which every practical physician is interested. If the above statements are correct, their truthfulness should be established beyond a doubt by the collective experience of the profession; if incorrect, they are, as I have said, liable to be seriously misleading and dangerous.

In considering this important subject it must not be forgotten that, in weighing the probabilities of the case, the negative evidence can not be considered as nearly so strong as the affirmative. In other words, while every one would admit that the rapid disappearance of serious cerebral symptoms under the use of large doses of the iodides was strong presumptive evidence that the cause of these symptoms was syphilis, yet, on the other hand, if a similar case failed to respond to the same doses by an equally prompt disappearance of symptoms, it would not be safe to assume that therefore the disease is not specific.

If, however, in the latter case the large doses of iodides failed to produce the condition known as iodism, would it still be sound practice to base further treatment upon that fact, believing that, in spite of the persistence of the symptoms, the disease was probably specific?

Whatever may be our views as to the cause of iodism (see p. 746), it is equally difficult to understand why the existence of syphilis, and particularly of late syphilis, should exert any preventive influence. Jullien's theory, which explains the alleged tolerance of large doses of iodide by syphilitic subjects through the presence of a poison, the destruction of which is supposed to exhaust the activity of the drug, can hardly be considered tenable. In a majority of syphilitic subjects the indications for the free use of iodine do not exist until the later or so-called tertiary stage, when the disease has lost all the peculiarities which indicate the presence in the blood and tissues of a living, active, generalized virus. Syphilis has then become nonsymmetrical, noncontagious, and in many cases nontransmissible, and it is in the highest degree improbable that any virus exists in any form which would so neutralize the effect of the iodine or the iodides as by that means alone to prevent their action upon the healthy tissues. It is evident that if the theory in question—namely, that tolerance of large doses of the iodide is, other things being equal, symptomatic or indicative of the existence of syphilis—is to rest upon clinical evidence, the cases which support it, or which can be adduced as arguments *pro* or *con*, must be very rare, and should include only those in which there has been opportunity for comparing in the same individual the action of full doses of iodides, before and after the contraction of syphilis. If the overwhelming and predominant influence of "idiosyncrasy" be admitted, the fallacy of assuming that special deductions as to the existence or nonexistence of any disease may be drawn from the production or nonproduction of iodism becomes evident. The large majority of the cases of syphilis which come under the notice of the neurological specialists are in the later stages, and the difficulties of diagnosis are often extremely great. While it is fair to assume that the rapid disappearance of coma, stupor, epilepsy, cranial pain, motor paralysis, and hemiplegia, under the influence of either large or small doses of the iodides, gives good presumptive evidence that the case is syphilitic, we can by no means assert that the persistence of those symptoms during the free use of iodides negatives the syphilitic theory of their origin. Seguin (Archives of Medicine, vol. xii, p. 128, 1885) has called attention to the fact that since Heubner has shown that very often in cerebral syphilis the lesion consists in obliteration of large arteries, with resulting ischæmia of a cerebral territory, and its death or softening, we must modify our prognosis and treatment. The moment that cerebral tissue undergoes such a process it is dead, and can not be restored by any amount of iodide of potassium or of any other drug. The syphilitic lesion, in other words, may be amenable to treatment, while its residua are not. Now if, in such a case, iodide of potassium were administered without result, but with the production of iodism, after moderate or even large doses had been given, from the statements of Professors Wood and Jullien, we would be led to the conclusion that the case was nonspecific, the failure to cure and the appearance of iodism both pointing in that direction. This might lead to the neglect of treatment of the greatest importance to the patient; for, although it might not be possible to replace tissue already softened and disintegrated, further extension of the specific element of the disease process could readily be prevented. It might be possible to prolong life, even if entire health could not be restored. If, on the other hand, we are dealing with a case of chronic encephalitis or of apoplectic or embolic softening, due to other causes, but with a suspicion of syphilis, and if the patient's idiosyncrasy permits of the use of large doses of iodides without the production of iodism, we may be led by the above rule, from a rational understanding and treatment of the case, into an unwarranted dependence upon a specific treatment. I have searched vainly through the literature of syphilis and the records of the therapeutic and toxic action of the iodides for any evidence corroborative of the above theory, but without much result. Barton, of Dublin, says that it is well known that iodide of potassium acts in a different manner upon the syphilitic subject from what it does upon others, and that large doses may be given to such patients for months without the production of any rash whatever; and I find a few similar statements indicating a moderately widespread existence of the same opinion; but, with the single exception of Jullien, I have not found it advanced by any syphilographer, the great majority of whom would doubtless agree with Mr. Hutchinson in the statement that the skin eruptions which may be produced by the iodides are certainly due to idiosyncrasy, and have little or no relation to the dose employed.

A few years ago Dr. Wood and I discussed this subject (Therapeutic Gazette, December, 1888), and subsequently I asked for and obtained the opinions of twelve of the leading syphilographers and neurologists of the country, who, without exception, agreed with me in the view that no such rule for diagnosis could be formulated.

From among the interesting replies which I received I may make a few quotations, not so much in pursuance of this argument as for the reason that they constitute valuable practical contributions to the therapeutics of syphilis, and as such are worthy of being put in more permament shape (Therapeutic Gazette, March 15, 1889).

Taylor said: "As to the action of the iodides in nonsyphilitics, my experience has convinced me that these salts are well borne by very many patients of both sexes and of all ages. In some, however, they produce such lesions and affections as dermal inflammations, coryza, and lachrymation, œdematous swelling of the parts supplied by the fifth nerve, cerebral hyperæmia, mental and physical depression, and gastro-intestinal irritation.

"Of these cases it may be said: 1. They may be persistent even when all possible means of amelioration have failed. 2. That in many instances, if the drug is pushed, notwithstanding perhaps some discomfort to the patient, these unpleasant and sometimes alarming phenomena will cease, and the drug will not be in any way harmful, and actually beneficial. 3. In some of these cases we, as they say, 'weaken' too quickly and give up the drug; whereas, if with proper moral courage (the urgent necessity of course existing) we increase the dose and go ahead, toleration is established. In many cases in my experience small initial doses have produced mischief, while the succeeding larger ones have been very acceptable. 4. In many cases, abstinence from liquors, alcoholic and fermented, care as to the simplicity and easy digestibility of the food, requisite medication for the stomach, and a general improvement of the alimentary canal, will be followed by a proper acceptance of the drug, perhaps with some preliminary skirmishing. 5. I have seen several cases in which the iodides were well borne previous to the onset of pathological changes in the kidneys, and after the evolution of the latter they were more or less toxic in their action, sometimes so much so that their administration was of necessity suspended. 6. I call to mind three cases in which, while the patients were high livers and deep drinkers (one exclusively of champagne), the iodides were not borne without great discomfort, but when they discarded these irritants and stimulants the iodides produced no discomfort (cerebral, dermal, nasal). 7. I have seen cases in which an intolerance of the iodide of potassium lasted twenty years, and at both ends of that period produced a characteristic bullous eruption.

"My experience has not convinced me that syphilis gives a man any immunity, partial or complete, to the toxic action of the iodides. Indeed, in general the experience I have already detailed with virgin subjects applies to syphilitic individuals. The secret of very many cases rests in the fact that dire necessity compels the continuance of these drugs, and the so-called intolerance is forgotten. In syphilitics, as in healthy subjects, an intolerance of to-day may be replaced by a condition of assimilation a month, a year, or several years hence."

Bryson said: "I am quite within bounds when I say that fully fifty per cent of the cases of late syphilis treated by me exhibit iodism long before sixty grains per day is reached. In fact, it is only in a minority of the cases that some of the toxic effects fail to show themselves before a dose of thirty grains per day is reached. If we include all the untoward effects of the iodides which we see in the eyes, nose, pharynx, fauces, mouth, stomach, skin, and nervous system under the term of iodism, I can not make out that the size of the daily dose bears any relation whatever to their appearance. So far as I can see in practice, a given patient who bears five-grain doses thrice daily, without any toxic effect, will bear equally well twenty-grain doses repeated at the same intervals. My own observations, then, accord with the assertion of Jonathan Hutchinson, that the size of the dose bears no relation to the frequency of the toxic effects. The most dangerous case of iodism which I ever had in my practice followed quickly upon a three-grain dose. When an important viscus (brain, liver) is threatened, or when any organ is having serious damage wrought in it by syphilis, I do not suppose that any one would be deterred from pushing the remedy by the occurrence of a minor evidence (acne, coryza) of iodic intoxication."

Hyde remarks: "We may entertain the suspicion that, if we only knew enough, there need be no intolerance whatever of the iodides by any person. The mischief is, we do not know how to establish toleration for some patients, while we do know for some others how to compass this end. Any conclusions based on different methods of administering the drug in different periods of the life of one person must be practically worthless. Given a uniform method and uniform conditions, and the number of idiosyncratic patients becomes rapidly smaller. Of this I am thoroughly convinced by experience. A few years ago I began to use only one method of administering the iodides, and by this term it may be conceded that all parties to the discussion intend to designate chiefly the iodide of potassium. That method was to employ a saturated solution, one grain to the minim of distilled water, given in milk, when that vehicle was not found to disagree as an article of diet with the patient to be treated. The dose was made, at the outset, not more than five to ten drops, the increase was ordered every three or four days, and in face of the chemical dictum lately set forth that the drug should always be given fasting, it was ordered after a small quantity of food was ingested. In this way the larger doses, as high as eight hundred grains daily, have been reached. I note, in passing, that it is my conviction that the very largest doses reached have not seemed as valuable as those which may be described as 'large,' the majority of all brilliant results being attained, I think, by a dose within rather than beyond two hundred grains daily.

"Observance of a uniform method in scores of cases soon led to the conclusion that 'idiosyncratic' patients were far fewer than was at first supposed. Careful graduation of the dose, and elimination of the cases in which the patient, eager for aid, surreptitiously swallowed more than his dose, threw new light upon this question. Again, the marked idiosyncratic exceptions that were observed soon occurred with symptoms of intoxication not cutaneous in type. Violent abdominal pains, tumefaction of the belly, grave prostration, and indefinable nervous impressions, which patients found difficulty in describing, but which they referred to with evident horror—these were of the class that proved exceptions to the rule. The symptoms of iodism strictly cutaneous in type were those suddenly occurring at the outset of administration of the drug, in non-syphilitic (often very young) patients treated somewhat awkwardly by general practitioners for eczematous and other diseases of the skin. Let me note, in passing, on this part of the subject, that of these cutaneous rashes, one, I am satisfied, is etiologically separated from all others. Whether the others be reflex, vaso-motor, or tropho-neurotic phenomena, or whether they be in part due to abortive efforts at elimination of iodine by the emunctories, it is certain that severe forms of purpura, even at times alarming in grade, may ensue long after full toleration has been established, being displayed most conspicuously in the lower extremities and over the belly. This, there can be but little question, is due to weakness of the vascular capillaries (probably induced by both syphilis and iodine intoxication long continued), a condition in the adult not greatly different from some of the reported forms of hæmophilia due to inherited syphilis."

The different formulæ which have been used for the administration of the iodides are numberless. A few have already been given (see p. 739). The saturated solution—℞ Potass. iodid., ℥ss., aquæ f℥ss., two drops of which contain one grain of the salt—provides an easy and efficient method of steadily increasing the dose. Starch water has been used as a vehicle, as have various sirups and mucilages. They have also been given in baths, by enema and hypodermatically, but these methods are only valuable in emergencies, and not very reliable even then. In my own experience, however, the most important practical point in securing the fullest good effect and the least harmful results from the administration of the iodide is *free dilution*. If the ordinary dose, whatever it may be, is given in six or eight ounces of water and soon followed by another tumblerful of water, a fair proportion of cases that previously seemed rebellious to the iodides will be found to take them with impunity. If the water be used *hot*, it will sometimes still further facilitate the easy and satisfactory ingestion of the drug.

The addition of ammonium chloride or carbonate has been thought to increase the efficiency of the iodides, and the following formulæ have been employed:

℞ Potassii iodidi,	
Ammonii chloridi	āā ʒj
Tr. cinchonæ comp.	f℥vj

M. Sig. A tablespoonful t. i. d.

℞ Ammonii carb.	ʒj
Potass. iodidi	ʒij
Syr. sarsaparil. comp.	
Aquæ	āā f℥jss.

M. Sig. One teaspoonful three or four times a day.

The most favorable time for the administration of the iodides is half an hour or an hour after meals. It is said that the griping which sometimes follows their use may be avoided by adding tannic acid to the solution, or by the use of the formula of Ricord and Nélaton:

℞ Potassii iodidi	ʒj
Syr. corticis aurantii	℥vj

M. S. A tablespoonful t. i. d.

I have not found these suggestions to be of much practical value.

The employment of *vegetable infusions and decoctions* is of great antiquity. I have found such remedies of use as adjuvants to the mercurial and iodide treatment, but absolutely without specific action of their own. The only two which are of much importance are the subjoined:

Succus alterans (McDade's formula).

℞ Ext. smilacis sarsaparillæ fl.,	
Ext. stillingia sylvat. fl.,	
Ext. kappæ minoris fl.,	
Ext. phytolaccæ decand.	āā f℥ij
Tinct. xanthoxyli carolin.	f℥j. M.

M. et S. Take a teaspoonful in water three times a day before meals, and gradually increase to tablespoonful doses.

I have often used this in alternation with the "mixed treatment" in cases where daily dosing with the latter could not be borne, and have thought that it was at least preferable to the entire intermission of treatment.

Taylor strongly recommends the fluid extract of coca, and uses the following formulæ:

℞ Fl. ext. erythroxylon cocæ	f℥ij
Tinct. cinchon. comp.,	
Tinct. gentian. comp.	āā f℥ij. M.

Sig. Two teaspoonfuls in a wineglassful of water three times a day, an hour after meals.

℞ Fl. ext. erythroxylon cocæ	f℥ij
Tinct. gentian. comp.,	
Tinct. cinchon. comp.	āā f℥j
Elix. calisayæ	f℥iv. M.

Sig. One tablespoonful in a wineglassful of water three times a day, one hour after meals.

I have not found it so good as an ordinary tonic mixture such as the following, which I am in the habit of prescribing for use by patients whose appetite, digestion, or nutrition needs attention:

℞ Strychniæ sulphat.	gr. j
Acid. phosphoric. dil.	fʒiij
Liq. pepsinæ	q. s. ad. f℥iv

M. et S. One teaspoonful in water after each meal and before going to bed.

The use of arsenic in syphilis has been suggested, but apart from its tonic properties, or its effect in controlling iodic acne, it has no special value. The use of potassium bichromate, as recommended by Guntz, has still less to justify it.

THE LOCAL TREATMENT OF SYPHILIS.

1. **The Chancre.**—The indications for cauterization and excision have been fully discussed (see p. 720). Topical applications to the chancre have been suggested in endless variety. I think that most sores should be treated on general surgical principles, and that while the principle of antisepsis has here but minor value, it may yet be applied with advantage and with the effect of hastening cicatrization, even if it has no influence in aborting or modifying the constitutional disease.

I have found the following formulæ very useful:

℞ Hydrarg. bichloridi	gr. $\frac{1}{10}$
Zinci sulpho-carbolat.	℈j
Ext. opii	aq. gr. xij
Aquæ ros.	f℥iv

M. et. S. Apply by means of a pledget of cotton. Change every two hours. Dilute if painful.

℞ Acid. boric.	℈ij
Tinct. opii	f℥ij
Liq. plumbi subacet. dil.	f℥ij

M. et S. Apply locally.

℞ Zinci chloridi	gr. v
Tinct. opii	f℥j
Aquæ ros.	f℥iij

M. et S. Apply locally.

℞ Acid carbolici	gr. v
Aquæ destillat.	f℥j

M. et S. Apply.

Pyoktanin, hydrogen peroxide, bismuth subiodide, salicylic acid, salol, europhen, zinc oleate, and dozens of other remedies new and old, have been employed, but I have found none of them to possess any special value.

Silver nitrate in sluggish sores has the same beneficial effect that it has upon similar sores which are nonspecific. It should be used in a strength of from twenty to forty grains to the ounce of water.

If the chancre is covered by a tough false membrane beneath which there has been double infection (syphilitic and pyogenic), and is extending steadily by ulceration, destructive cauterization may be necessary. In this case nitric acid or the acid nitrate of mercury should be used, and should be carefully applied to the surface of the sore, the surrounding healthy tissue being protected by oiled cotton. Antiseptic fomentation should follow.

Gangrenous or phagedenic chancres require similar treatment. Among dry powders *iodoform* still holds the first place in my estimation, and may be used pure, or mixed with powdered boric acid or starch.

Calomel, mixed in equal quantities with lycopodium or with powder, is a fairly satisfactory local remedy.

Burtze has used *dermatol* (bismuth subgallate) in seventy cases of soft and hard chancres, and in open buboes. The salt was used either in powder, twice daily, or in the form of a ten or fifteen per cent vaseline ointment in cases of very flabby and deep ulcers. His results were favorable. The advantages claimed for this bismuth salt are: (1) It induces far more rapid healing and cicatrization than iodol or naphthalin; (2) it never irritates the surrounding skin; (3) it is quite free from unpleasant smell and toxic effects; (4) it is relatively cheap.

Bovero also reports numerous rapid cures of balano-posthitis and syphilomata from the application of dermatol.

Guntz highly recommends *aristol* as a substitute for iodoform. It should not be used in the form of an ointment, but should be applied directly to the wound. It is insoluble in water, but forms a tough brown paste with olive oil, which, however, is difficult of application. The undissolved powder is inert. In applying it, therefore, the sore should be strewn with the powder, and a drop of olive oil allowed to fall on it from a glass rod; without waiting for it to dissolve, it should be covered over with some thin impermeable substance, under which the solution takes place slowly. No cotton or charpie should be applied to the ulcer. The dressing should be renewed twice daily. Its advantages are said to be its painlessness, odorlessness, and nonirritating properties. Painful ulcers become painless after its use. If, however, as in the case of torpid ulcers the tendency to healing is not sufficiently rapid, recourse must be had to iodoform. It is of especial value in secondary lesions, in ulcerating gummata, tubercular syphilides, etc.

The Syphilides.—*The Erythematous Syphilide* usually requires no local treatment. It may exceptionally be persistent and conspicuous enough to demand some special medication. In that event the following formulæ will be found useful:

℞ Hydrarg. chlorid. mit. . . . . ʒj
Unguent. zinci oxidi,
Unguent. petrolei carbolat. . . . . āā ℥ss.
M. Ft. ung. S. Apply.

℞ Hydrarg. chlorid. mit.,
Pulv. amyli . . . . āā ℥j
M. et S. Dust lightly over the parts affected.

The Papular Syphilides.—These are often obstinate, and may usually be much benefited by (1) vapor baths, (2) inunctions with the simultaneous use of massage (Balzer), and (3) ointments containing mercury in one of the following formulæ:

℞ Ung. hydrarg. nitrat.,
Ung. petrolei carbolat. . . . . āā ℥ss.

℞ Hydrarg. ammoniat. . . . . ℈j
Unguent. aquæ ros. . . . . ℥j

If they are of the papulo-squamous variety, the above ointments are especially useful. If they involve the hand, where they are so apt to be persistently recurrent, the local vapor bath proposed by Wells (Medical Record, May 13, 1891) is sometimes very useful. I have tried it in a few cases with excellent result. A hole is cut in the side of an inverted hat-box, through which the affected hand can be inserted. The interior is then filled with the vapor of calomel by means of an alcohol lamp beneath a tin tripod, on which the mercurial is sprinkled.

Mucous Patches.—So far as concerns the mouth—the most frequent seat of these troublesome manifestations—the prophylactic treatment is that which is appropriate for the prevention of ptyalism, and has already been considered (see p. 745). If the patches appear they may best be healed by the application two or three times daily of silver nitrate, five to twenty grains to the ounce, and the employment of some antiseptic and detergent mouth-wash. I frequently use the following:

℞ Acid. boric.,
Acid. tannic. . . . . ℥ ℈ij
Mel. ros. . . . . ℥fij
Aquæ . . . . ℥fvj
M. S. Use as a mouth-wash.

Sprays of listerine, or of Dobell's solution, or of hydrogen peroxide, may be employed. Sometimes a sublimate wash is of much advantage.

℞ Hydrarg. bichlorid.	gr. j
Mel. ros.	f℥ij
Aquæ	f℥vj

M. S. Use as a mouth-wash.

A diluted tincture of iodine is sometimes a useful application.

Mauriac gives the following formulæ for use in ulcerative throat lesions:

℞ Cinnabar	gr. xv
Hydrarg. iodidi vir.	gr. vijss.

M. S. For one fumigation lasting twenty-five minutes.

℞ Hydrarg. iodidi vir.	ʒss.
Carb. lig.	℥jss.
Benzoini	gr. vijss.
Aquæ	q. s.

M. Ft. trochisci no. xx.

S. One to be burned morning and night and the vapor inhaled.

Nothing in the way of treatment will be satisfactory if the patient is careless about the use of the toothbrush, neglectful of the general condition of the mouth and teeth, or if he is an habitual smoker. Of course, the chewing of tobacco is equally harmful.

Condylomata, if vegetating and exuberant, should be cauterized with nitric acid, acid nitrate of mercury, or chromic acid. The latter two should be used with special caution, as the application of the mercurial solution has been followed by salivation, and chromic acid has caused death. (See a paper in which I reported a case of this character, Univ. Med. Mag., October, 1889.)

Another method of destroying the acuminated condylomata, recommended highly by Tschernomordik, is the use of caustic lead. In the following form he has seen it, as a rule, destroy them down to their base, a single application being usually sufficient. In some cases, however, it must be repeated twice or thrice at intervals of two or three days.

℞ Plumbi oxidi	gr. iv
Liq. potass. caust. (33 per cent)	♏ cxvj

M. S. Caustic; for external use only.

The remaining surface is dusted with iodoform, and a cicatrix forms in from three to ten days.

Bumstead and Taylor use in these specific as well as in nonspecific vegetations the following modification of an old formula:

℞ Acidi salicylici, Ext. cannabis Indica	āā gr. xxx
Collodion (flexible)	℥j. M.

This should be painted on after careful drying.

In mild cases of condylomata absolute cleanliness and dryness and dusting with calomel powder usually bring about a cure.

Pustular and Pustulocrustaceous Syphilides.—These lesions are especially benefited by sublimate baths (see p. 785), vapor baths (see p. 784), and by the calomel and zinc ointment (see p. 803). The latter may be used on the face at bedtime. If the exudation about the base of the pustules is extensive and the crusts are thick and adherent, the following ointments will be found useful:

℞	Hydrarg. bichlorid.	grs. ij
	Unguent. hydrarg. nitratis,	
	Ung. petrolei carbolat.	āā ℥ ss.
℞	Hydrargyri oxidî rub.	ʒ ij
	Unguent. zinci oxidi	ʒ vj

Tubercular Syphilides, Gummata, and Periosteal Nodes, when non-ulcerated, may best be treated locally by the continuous application over their surface of the following ointment spread on a piece of lint:

℞	Ung. iodini comp.	ʒ j
	Ung. belladonnæ	ʒ ij
	Ung. hydrarg.	ʒ iij
	Ung. petrolei carbolat.	ʒ iv

If ulceration has occurred, they may be curetted and treated according to general surgical principles.

Dotchevsky warmly recommends the following as a simple and efficacious method of treating obstinate syphilitic ulcers of the leg: The ulcers are first washed out with an antiseptic solution, carbolic or sublimate. The surface is then dried by absorbent cotton and afterward tightly covered by a piece of mercurial plaster. In the beginning of the treatment this should be repeated daily, later on every other day, and ultimately every third or fourth day. The patient remains up and about during the treatment. On the first day the edges of the ulcer are found considerably congested. In a few days the surfaces become studded with bright red succulent granulations. Small ulcers heal in a fortnight, large ones in a month or six weeks. It is necessary that the plaster should be about four times as large as the ulcer and about one tenth of an inch thick. If the discharge is profuse, the surface should be powdered lightly with iodoform before applying the plaster.

The plaster used by this author is the emplastrum hydrargyri vel mercuriale, which contains twenty per cent of metallic mercury, with the addition of turpentine, colophony, etc.

Visceral or Bone Syphilis rarely affords much opportunity for local treatment, but as a rule indicates the vigorous employment of the mixed treatment.

Basing his practice upon the theory that there is often a disturbance of the reflex centers in certain specific affections, as, for example, those of the larynx or the brain, and that the comparatively slight lesions there found do not justify the belief that they are alone the cause of all the observed symptoms, Augagneur has used *the bromides* in combination with the iodides, believing that they control the reflex nervous symptoms, and claims to have found great benefit from so doing.

The cephalalgias of the tertiary period are as happily influenced by it. The ordinary mixed treatment relieves these symptoms, but there is an apparent pathological residue which that treatment seems unable to overcome. The dose required is not over three grammes (gr. xlv) in twenty-four hours, and he believes this treatment in combination with the mixed will overcome the cerebral and nervous irritability that is so frequently the consequence of syphilitic disease.

Daizens, acting upon the theory that the iodides of sodium and ammonium are much more soluble than the iodide of potassium, and will therefore be first eliminated by the kidneys, and will occasion the detention of the last-named salt within the system, believes that he has found a method of enhancing the value and efficiency of the iodides. The following, used in a case of intense headache and ozæna, gave great relief:

℞ Ammon. iodidi,	
Sodii iodidi,	
Potass. iodidi	āā ℥ ss.
Hydrarg. iodi. rubr.	gr. ¾
Aquæ	f ℥ vj

M. et S. Two teaspoonfuls in water three times daily.

Syphilitic Affections of the Eye and Ear belong to the specialists in those departments, and should usually be treated by them.

The Influence of Erysipelas on syphilitic lesions has been noted by M. Costella (Giornale Ital. dell. mal. Venere, etc., July, 1886) and M. Molnar (Oest. med. chirurg. Presse, 1887, No. 9):

> The first case was one of inherited syphilis in a girl of twenty-one, who had certainly suffered to an unusual extent from disease of the joints; both knees, one shoulder, and both elbows had been the subject of chronic synovitis, in the last case leading to anchylosis. There was much enlargement about the epiphyseal lines, many subcutaneous gummata, and large ulcers over both shoulders. The spleen and liver were also enlarged. During her treatment in the hospital by sublimate injections and iodide of potassium she passed through two attacks of erysipelas, each of which appeared to have the most beneficial effects upon the syphilitic lesions. The ulcers healed, the liver and spleen returned to their normal size, the swelling about the joints subsided, and the patient gained very considerably in weight. While of course attributing this improvement largely to the treatment, M. Costella believed that the erysipelas hastened the recovery materially. Its remarkable effect upon chronic ulceration due to inherited syphilis has been observed frequently; in fact, we knew of one case which was sent into an erysipelas ward in order to be inoculated, and in whom the experiment was very successful.
>
> M. Molnar's case was one of acquired syphilis (in the secondary stage) in

which the patient had an extensive ulcer over one parietal bone with necrosis. While in the hospital for his syphilis he contracted erysipelas of the head, the attack leading to marked improvement of the ulceration, which ultimately cicatrized.

THE TREATMENT OF HEREDITARY SYPHILIS.

The treatment of inherited syphilis may be considered: 1. In relation to the prophylactic treatment of the parents, before conception; 2, the treatment of the mother during pregnancy; and, 3, that addressed to the child *in utero* and after birth.

1. The *prophylactic treatment* is, in general, the treatment of the individual, and has been already described, but is here employed with special reference to the suppression of active syphilis during the period before conception and with increased attention to the rules of hygiene applicable to the sexual relations.

Perhaps the most important prophylactic treatment which the physician can employ has reference to the date of marriage of syphilitics. It would not be proper to discuss that subject at much length here, but I may venture to refer the reader to my article on Hereditary Syphilis in the American System of Medicine (vol. ii, p. 254) for a statement of my views. I desire to say now, however, with the fullest possible emphasis, that I believe the doctrine that it is proper to permit the entrance of a syphilitic into conjugal relations two and a half years after infection is dangerous, and is not warranted by the general experience of syphilographers and of the profession. I have had no small number of patients who have married within those limits, contrary to my advice or because marriage was for some reason imperative, and a large proportion of these have had healthy children, their wives remaining uninfected. The minority, however small, must nevertheless be considered, and that thére always will be such a minority composed of syphilitic parents and children, if the above rule is carried out, I am firmly convinced.

It is far better to make the earliest period at which marriage may take place, with the full consent and approval of the physician, four years, and to let the patient take the responsibility if he or she marries sooner. Active treatment of the syphilitic husband, especially during such times as he is having periodical cohabitation with his wife, is of much importance in prevention.

2. *The treatment of the mother*, whether previously syphilitic, or having conceived by a syphilitic husband, or having contracted the disease after impregnation, is simply the treatment of acquired syphilis in any person. Mercury in full physiological doses is the drug indicated. It may not be amiss to combine with it iodide of potassium in moderate doses, but the practice of employing the latter to the exclusion of the

former is both theoretically and clinically unsound Care should be taken to give the mercury in such a manner that it shall not produce any irritating effects on the intestinal canal, whether guarded with opium, by inunction, vaporization, or injections. The advantages of each method have been discussed under their appropriate headings. In all medication great care should be taken not to produce purging, as the intimate relation existing between the alimentary canal and the uterus may lead to abortion.

That the treatment of the mother is beneficial both to herself and to the child is beyond all doubt, and if it fails by one method another should be tried; but I have confidence that the administration of mercury by the mouth (and of iodide of potassium when indicated) will be found of just as much value in the pregnant syphilitic woman as in the same woman not pregnant, though Taylor says that that form of medication is "utterly futile." My own experience leads me to depend upon it, and, I think, justifies me in recommending it, under the limitations mentioned above, and with inunctions as an occasional adjuvant.

3. Abner Post (Cyclopædia of the Diseases of Children, vol. ii, p. 211) says very properly:

> "A question that often presents itself at the very outset is as to the propriety of commencing treatment of a babe apparently healthy, but born of syphilitic parents. Parrot would await manifestations, but would commence treatment in the absence of external manifestations, when there existed obstinate intestinal affections not due to athrepsia."

He then quotes the well-known rules of Fournier as to treatment from birth as follows:

> 1. An infant born healthy, in appearance at least, of a syphilitic father, need not be treated. One knows that paternal heredity is much less certain than maternal heredity; consequently the infant has chances of having escaped the syphilis.
>
> 2. A child born healthy, in appearance at least, of a mother formerly syphilitic, and who has not shown any accidents of syphilis during her pregnancy, need not be treated, since, if there are chances of its being syphilitic, there are also chances of its not being so.
>
> 3. A child born healthy, in appearance at least, of a woman recently syphilitic—above all, if she has had venereal accidents in the course of her pregnancy —ought to be treated energetically from its birth, since it is certain, in spite of all appearances to the contrary, that it is syphilitic, and that its latent syphilis may declare itself at any moment and give rise to grave and even fatal accidents.

Since the pathology, the stages, and the general course of hereditary syphilis are all closely related to or identical with the same phenomena in the acquired disease, and we know that they both depend upon the same ultimate cause, it is logical to use in the treatment of the one the same principles that govern us in the other.

We know that clinical experience teaches us that mercury exercises an almost controlling influence over the secondary manifestations of acquired syphilis. We know also that the iodide of potassium, probably by its powerful stimulating action on the lymphatic system, has an equal power over the tertiary growths. In hereditary syphilis there are, however, two elements that should modify the treatment somewhat, and must be taken into consideration. These are: 1. The existence of a more or less profound cachexia influencing all the nutritive and formative processes, and in itself, aside from any definite specific involvement of vital organs, threatening life. 2. The not infrequent occurrence during the secondary period of symptoms—notably gummata—belonging to the tertiary stage.

The first indication is met by making the treatment from first to last not only antisyphilitic, but also supporting and even stimulating; and with this object in view special attention should be paid to nutrition. It may be stated axiomatically that for every reason, whenever it is within the bounds of possibility, the nurse of a syphilitic child should be its mother. To her it is harmless; to every other woman, not already syphilized, it is in the highest degree dangerous. If neither mother nor wet nurse can be had to suckle the child, it must be fed on cow's, goat's, or ass's milk, or by artificial alimentation; but its chances of life will be immeasurably reduced. In addition to careful feeding, a little tonic treatment should be employed from the beginning in conjunction with the specific remedies, iodide of iron, cod-liver oil, and preparations of phosphates being the most useful drugs. The chance of tertiary symptoms appearing in the secondary stage leads us to combine with the mercurial treatment from the first small doses of the iodide of potassium, or some other soluble and easily decomposed salt of iodine.

These principles of treatment being recognized, the routine procedure may be thus described: Give mercury as soon as the diagnosis of syphilis is assured, preferably by inunctions. Sir Benjamin Brodie's opinion, expressed many years ago, still represents that of the majority of the profession: "I have tried different ways of treating such cases. I have given the child gray powder internally and given mercury to the wet nurse. But mercury given to the child by mouth generally gripes and purges, seldom doing any good, and given to the wet nurse it does not answer very well, and certainly is a very cruel practice. The mode in which I have treated cases for some years past is this: I have spread mercurial ointment, made in the proportion of a drachm to an ounce, over a flannel roller and bound it around the child once a day. The child kicks about, and, the cuticle being thin, the mercury is absorbed. It does not either gripe or purge, nor does it make the gums sore, but it cures the disease. I have adopted this practice in a great many cases with signal success. Very few children recover to whom mercury is given internally, but I have not seen a case where this method of treatment has failed."

The treatment of infantile syphilis by the use of hypodermatic injections of mercurial salts has recently been adopted by some syphilographers. The advantages claimed for it are summed up by Moncorvo and Ferreira as follows: 1. The hypodermatic method must hereafter be included among those used in hereditary syphilis. 2. Among the various mercurial preparations employed, preference should be given to gray oil among the insoluble salts, and to corrosive sublimate among the soluble. 3. The injections of both preparations are perfectly well borne and are notably beneficial. 4. The injections should be preceded by careful antiseptic measures, an interval of four days being the one advised. 5. The results obtained are favorable, and their efficiency is in no degree inferior to other modes of treatment. 6. Cutaneous syphilides, gummata, etc., are more quickly influenced by mercurial injections, but glandular affections are more slowly acted upon. 7. As a general mode of treatment the hypodermatic use of mercurials is well borne by infants, and is free from the ordinary accidents, such as salivation, stomatitis, intestinal disturbance, etc.

I should say, however, that a careful perusal of their paper fails to inspire me with a feeling of confidence in these claims.

When for any reason, as irritation of the skin, either or both of these modes are contraindicated, treatment by the mouth must be resorted to, and probably the best formula to employ is the following:

℞ Hydrarg. cum creta	gr. j–vj
Sacch. alb.	gr. xij

M. et div. in chart no. xij.
Sig. One powder three times a day, to be taken soon after nursing.

Bumstead and Taylor have used in many cases with great benefit the following:

℞ Hydrarg. biniodidi	gr. j
Potass. iodid.	ʒiv
Syr. sars. comp.,	
Aquæ	āā ℥ij. M.

Of this mixture a child one month old may take five drops thrice daily, increasing the dose by a drop every five days. To a patient over five years of age half a teaspoonful may be given, the dose being gradually increased to one or one and a half teaspoonfuls.

Externally, at the same time, a mild mercurial ointment may be used, or, better, the following may be kept in contact with the skin under pressure:

℞ Ung. hydrarg.,	
Ung. zinci oxid.	āā ℥ ss.
Bals. Peru	ʒ j. M.

In conjunction with the internal use of the powders of mercury with chalk, iodide of potassium may be given in a sirupy solution, as also in conjunction with the use of inunctions, in doses varying from half a grain to a grain, or, if there be any marked tertiary symptoms, even in much larger doses, three or four times daily. The treatment, no matter in what form, should be continued long after the disappearance of syphilitic symptoms, and it would be well to continue the mixed treatment till after puberty. In all cases, as in the treatment of adult syphilis, in addition to the medicinal treatment special attention should be paid to cleanliness and hygiene, with life out of doors and healthy, invigorating food. It may be useful to mention in outline the treatment recommended by two or three additional authorities:

Simon (Journal des Maladies Cutanées et Syph., No. 5, 1891) recommends for an infant of five or six weeks the liquor of Van Swieten, as preferable to other preparations, in the dose of fifteen to twenty drops per day, taken in three or four divided doses. Mercurial frictions can be applied at the same time in the armpits.

The following formula is given:

℞ Neapolitan ointment	ʒ j
Lanolin	ʒ iij

Mix and divide into six doses, wrapped separately in paraffin paper.

Each day one is used for a friction in the axilla, and after from two to four days a tepid bath is given.

Widerhofer employs the following ointment upon the sides of the nose in cases of "snuffles":

Red precipitate	gr. ij
Lanolin	℈ viij

This is to be applied by mild frictions in quantity equal to that of a pea. This mode of application has the advantages of diminishing the swelling of the mucous membrane of the nose, when it exists, thus permitting the infant to take the breast more readily.

Simon thinks corrosive sublimate baths are useful, especially in rebellious cases which do not give way to the means above referred to. They must be repeated every three days, and during the immersion care must be taken to prevent the infant from swallowing any of the toxic fluid.

The following is the formula for each bath:

Corrosive sublimate	gr. iv
Hydrochlorate of ammonia	gr. xv
Distilled water	f ℥ iv

If the infant is over six months of age, and is raised on the bottle, the milk can have Gibert's sirup added to it, a third of a teaspoonful in divided doses during the twenty-four hours (Journal of Cutaneous and Genito-Urinary Diseases, vol. ix, 1891, p. 315).

Starr (Medical Chronicle, May, 1890) gives the following advice: Should one or two children in a family be born syphilitic, and another be expected, it is always advisable to treat the mother for the specific disease. If the child be born apparently healthy, antisyphilitic treatment must be begun at once. He prefers the mercurial treatment from the outset. Mercury may be administered by the mouth, by baths, or by inunction. By the mouth, one $\frac{1}{120}$ grain of corrosive sublimate may be given three times a day, or $\frac{1}{12}$ grain of calomel thrice daily; or, again, one grain of mercury with chalk three times daily, gradually increasing each dose to two grains. The last is less apt to disturb the stomach or the intestines than either of the former.

Mercurial baths should be used every two, three, or four days, unless erythema be produced by their employment. Each bath at first contains half a drachm of corrosive sublimate, the quantity being increased fifteen grains at a time, until finally a drachm or a drachm and a half be reached. Personally he prefers inunction. Fifteen grains to half a drachm of mercurial ointment should be rubbed into the skin daily, a different portion of the body being selected each day in order to minimize irritation; or it may be smeared on the child's binder, its natural movements being sufficient to rub it into the skin. Iodide of potassium is useful when there is bone trouble with nocturnal pains, and in the nervous affection may either be used alone or in combination with mercury.

Various local treatments are necessary. In cases of coryza, keep the nose clean by syringing with salt and water (one drachm to one pint) twice daily. Touch the nasal membrane every other day with a weak solution of nitrate of silver (five grains to one ounce), or blow into the nostrils thrice daily a powder composed of boracic acid twenty grains to forty grains of bismuth subnitrate. Ulcers of the lips should be touched with the solid stick of silver nitrate, followed by the application of the dilute citrine ointment, or the ointment of the ammoniated mercury one half the officinal strength. Patches on the skin are to be cleansed with salt and water, and then dusted with calomel. For the eruption simply apply the nitrate or ammoniated mercurial ointment.

The *indirect treatment* of the child through the milk of the mother or the nurse has an interesting literature well summarized by Taylor (*op. cit.*), the evidence being in favor of the view that both mercury and potassium iodide, given in this way, are of some value, especially the former, and that the method is one of possible utility in cases where other plans of treatment have failed or must be temporarily interrupted.

The *local treatment of the mother* during pregnancy is held by Augagneur to be of the highest importance. Free antiseptic disinfection must be used from the first, with sublimate and boric-acid solutions, but care must be taken not to apply solutions too strongly or too freely. The humidity of the parts during pregnancy may cause accident. Hypertrophic lesions of the vulva must be carefully treated, and a powder of ten parts of boric acid to twenty of talc is the best to keep the parts dry. Without treatment, condylomata grow rapidly in pregnancy, and may cause complications.

SYPHILIS IN RELATION TO PUBLIC HEALTH.

By SAMUEL TREAT ARMSTRONG, M.D.

The relation that any disease bears to the public health is in a direct ratio to its prevalence and to its preventability.

Upon the latter depend the measures that must be adopted to secure the limitation of the manifestation of the disease by means of the isolation of affected persons and their proper treatment, together with such sanitary measures as may seem necessary, or that experience has taught to be desirable, to conserve the health of the associates of those that are affected. In elaborating any plan to attain these ends it is necessary to base all action upon the evidence that is afforded by the frequency with which the disease occurs, and this latter is largely influenced by the particular classes of society in which it is met with. As subsidiary but still important features, it is desirable to determine whether men or women are the more frequently affected; what the influence of the disease may be upon the birth-rate of the nation; and what its influence is upon the death-rate.

A study of syphilis, therefore, in relation to public health entails a consideration of the danger of syphilis in regard to the individual. This necessitates the determination of the proportion of persons affected by syphilis; the incapacity that is the consequence of the disease, including the economic factors of the loss of time and of wages; and the influence that syphilis exercises on health and on lóngevity, these latter being of further interest and importance in the relation they bear to life insurance.

It will be further necessary to consider the danger of syphilis in regard to others; this would include a consideration of the various ways in which people may extra-sexually acquire syphilis, as well as a consideration of syphilitic infection by marriage. This latter topic would include also a study of the relation the disease bears to the birth-rate as well as a study of the charge imposed on the community by the diseased offspring of syphilitic parents.

Finally, it would be desirable to consider the disease in its general relation to the community, as well as its effects on races and on nations, and the means to be adopted for its control.

Value of Statistics.—That "the literature of syphilis is encumbered with ill-founded opinions and untrustworthy facts" no one that is conversant therewith will venture to deny. And perhaps regarding no portion of that subject are vague ideas and misleading statistics more frequently encountered than in those publications that consider the relation of syphilis to public health. The gamut of the theme runs from the benignity to the malignity of that disease, either partisan presenting what seems to him to be satisfactory evidence of the tenability of his position, while a flood of literature gives us the statistics of some particular medical service; ignoring, as a rule, any consideration of the proportion that these particular cases bear to the total number of cases of all the diseases treated. Interesting as may be the statistics of syphilitic cases treated in some institution devoted almost exclusively to the treatment of cutaneous and venereal diseases, they only suffice to inform us regarding the proportion such cases bear to the general total of those diseases; and to ascertain the proportion that syphilitic bear to general diseases, it becomes necessary to consult the statistics of hospitals that treat all kinds of diseases.

Statistics of General Hospitals.—Here our research is confronted by the fact that general hospitals, as a rule, take but few patients suffering from syphilis; the illogical position being maintained that such patients are affected by a disease that has been acquired in consequence of their own viciousness, and that, as a hospital can not afford relief to all that apply therefor, these cases are best refused. Thus, in the reports of the Massachusetts General Hospital for the years 1879 to 1887 inclusive, it may be found that from four to twelve per cent of the total number of persons refused admission were suffering from syphilis. The annual reports of St. Luke's Hospital, New York city, show the number of cases of men and women suffering from syphilis that were treated in that institution, as well as the diseases from which those refused admission were suffering. From Table I it may be seen that from three to fifteen times as many syphilitic patients were refused treatment as were treated for that disease. And from this hospital, here cited because its reports happened to be most convenient, we may judge the action of most if not of all similar institutions.

TABLE I.

Per Cent of Syphilitic Patients treated and refused Treatment, St. Luke's Hospital.

YEAR.	1881.	1882.	1883.	1884.	1885.	1886.	1887.	1888.	1889.	1890.
Per cent of syphilitic patients treated	0·8	0·7	0·9	1·0	1·2	1·1	0·8	1·3	1·3	1·8
Per cent of syphilitic patients among those refused	6·0	4·8	4·8	15·4	18·0	4·0	4·4	5·0	5·4	4·5

Another disadvantage that is encountered by those seeking statistical evidence upon this subject is, that many reports include under the caption "venereal diseases" all forms of venereal disease as well as syphilis. This has made it impossible to take advantage of many reports of which it would have been desirable otherwise to make mention.

Statistics of the United States Marine Hospital Service.—It has seemed possible that fair deductions regarding the general prevalence of syphilis might be obtained by taking a series of reports, as those of the United States Marine Hospital Service, in which there were records of a large number of diseases, and ascertaining therefrom the proportion that syphilis bore to the total number of cases treated. Then, with army and navy statistics, it would be possible to determine the frequency with which that disease occurred among selected healthy men, and the mortality that it caused. Finally, taking the mortality statistics of some large city, the proportion that the syphilitic mortality bore to the general mortality could be learned, and by comparison with the figures obtained by the two foregoing methods an approximation might be attained of the number of cases of that disease that existed in a community. In several of the tables that have been compiled for this paper it will be noticed that statistics of ulcer of the penis, a purely nonspecific lesion, are included. The reason for this is that, previous to 1886, when the new edition of the Nomenclature of the Royal College of Physicians was published, it was not infrequently the case that hard chancres were included under the caption of ulcer of the penis; consequently, for the purpose of comparison, and to exclude this source of error, the statistics for the latter disease are included in the tabulation.

From the statistics of the United States Marine Hospital Service for the decade 1881 to 1890 inclusive, given in Table II, it may be learned that in a number of patients, ranging from thirty-two to fifty thousand a year, the number of cases of primary syphilis varies from three to five and two tenths per cent; that of secondary syphilis varies from twelve and one tenth to fifteen per cent; while the percentage of deaths due to syphilis to the total mortality varies from one to two and three tenths per cent. When these statistics are further analyzed, a difference is found between the frequency with which these forms of syphilis occur in hospital and in dispensary patients. In the former class the percentage of primary syphilis varies from one to three, while among dispensary patients it varies from one and one tenth to two and two tenths per cent; and secondary syphilis in the former class varies from four and five tenths to six and four tenths per cent, while in the latter class it varies from seven and two tenths to eight and six tenths per cent. The average annual percentage of cases of primary syphilis among hospital patients is 1·94, and among dispensary patients it is 1·58; the average annual percentage of cases of secondary syphilis in the former class is 5·29, in the latter 7·77. Notwithstanding the wide variation in the number of patients treated annually, an inspection of the table shows the close relationship sustained between the percentage of cases of primary and of secondary syphilis. A calculation of the mean and of the probable error gives the following figures:

Hospital patients:	primary syphilis, mean error	0·51
" "	" " probable error	0·34
" "	secondary syphilis, mean error	0·275
" "	" " probable error	0·182
Dispensary patients:	primary syphilis, mean error	0·47
" "	" " probable error	0·31
" "	secondary syphilis, mean error	0·34
" "	" " probable error	0·22

This calculation further justifies the selection of these statistics, for the variation of error in the hospital and dispensary cases is some hundredths of one per cent, notwithstanding the fact that the cases are observed by a number of physicians, and the opportunity for error due to "the personal equation" are correspondingly multiplied.

In 1881, 9·7 per cent of the total patients treated were suffering from syphilitic diseases; in 1882, 8·8 per cent; in 1883, 8·2 per cent; in 1884 and 1885, about 7·6 per cent; in 1886, 8·3 per cent; in 1887, 1888, and 1889, about 9·2 per cent; and in 1890, 8·4 per cent. In other words, among a number of thousands of patients coming from a class of society supposed to be particularly susceptible to venereal diseases, less than ten per cent of the total number of patients treated were suffering from the various forms of syphilis. These percentages show no tendency to an increase or to a decrease of the disease during successive years, and their range of variation is so moderate that the mean and probable error of each year is about one per cent. Another factor that is to be considered is, that there is absolutely no more restriction imposed upon these men than there is upon the members of the community at large.

The mortality rate in Table II has been calculated on the ratio that the deaths from syphilis bear to the total number of deaths from all diseases, and the average for the decade is 1·84 per cent; or in ten thousand deaths from all causes in this class of our population, one hundred and eighty-four deaths will be caused by syphilis. Still, this mortality from the disease during the decade specified was but eighty-four hundredths of one per cent of the cases of syphilis treated in the hospitals; and as only the severe cases seek hospital treatment, the percentage would be greatly reduced if the calculation of the mortality percentage was based on the number of cases of syphilis treated in the hospitals and dispensaries.

TABLE II.

Venereal Statistics, United States Marine-Hospital Service.

HOSPITAL PATIENTS.

YEAR.	Ulcer of penis.	Primary syphilis.	Secondary syphilis.	Average number of days in hospital.	Deaths.
1881: In hospital	1,116	284	804	25·3	8
Per cent of total	9·0	2·2	6·4	....	2·0
1882: In hospital	1,054	257	677	26·2	5
Per cent of total	8·0	2·0	5·1	....	1·0
1883: In hospital	1,098	197	690	24·7	11
Per cent of total	8·2	1·4	5·1	....	2·0
1884: In hospital	973	156	650	25·2	10
Per cent of total	7·4	1·1	4·9	....	2·0
1885: In hospital	827	135	583	25·3	9
Per cent of total	6·4	1·0	4·5	....	2·8
1886: In hospital	331	278	626	25·1	5
Per cent of total	2·6	2·2	4·9	....	1·8
1887: In hospital	234	405	660	25·1	7
Per cent of total	1·7	3·0	5·0	....	1·7
1888: In hospital	340	367	805	25·3	9
Per cent of total	2·4	2·6	5·7	....	2·0
1889: In hospital	343	299	777	26·9	10
Per cent of total	2·5	2·1	5·8	....	2·1
1890: In hospital	822	263	809	27·1	9
Per cent of total	2·2	1·8	5·5	....	2·0

DISPENSARY PATIENTS.

YEAR.	Ulcer of penis.	Primary syphilis.	Secondary syphilis.
1881: Number	1,117	331	1,751
Per cent of total	5·5	1·6	8·6
1882: Number	1,397	374	1,902
Per cent of total	6·4	1·6	8·2
1883: Number	1,461	403	2,125
Per cent of total	5·4	1·5	7·9
1884: Number	1,503	382	2,370
Per cent of total	4 7	1·2	7·4
1885: Number	1,213	320	2,228
Per cent of total	4·2	1·1	7·7
1886: Number	853	537	2,269
Per cent of total	2·7	1·7	7·2
1887: Number	840	737	2,496
Per cent of total	2·6	2·2	7·7
1888: Number	966	690	2,513
Per cent of total	2·8	2·0	7·3
1889: Number	975	631	3,001
Per cent of total	2·7	1·7	8·3
1890: Number	1,015	448	2,773
Per cent of total	2·8	1·2	7 6

With these statistics of a class of men whose sanitary environment is subjected to no medical restriction we may compare the records of the army and navy, wherein the men have constant medical supervision, for the same period.

Statistics of the United States Army.—The army statistics, for which I desire to express my obligation to Surgeon-General C. Sutherland, are presented in Table III.

TABLE III.

Venereal Statistics, United States Army.

YEAR.	Ulcer of penis.	Primary syphilis.	Secondary syphilis.	Invalided (discharged).	Deaths.	Average number of days in hospital.
1881 : In hospital.....	*	616	491	120	2	‡
Ratio per M....	....	24·2	19·3	4·7	..	....
1882 : In hospital.....	....	467	466	100	..	....
Ratio per M....	....	18·7	18·7	4·0	..	....
1883 : In hospital.....	....	487	348	106	2	....
Ratio per M....	....	19·2	13·7	4·1	..	....
1884 : In hospital.....	....	407	311	83	1	....
Ratio per M....	....	15·5	11·9	3·1	..	....
1885 : In hospital.....	194	†	604	89	..	....
Ratio per M....	7·2	....	22·7	3·3	..	....
1886 : In hospital.....	150	....	527	85	..	....
Ratio per M....	5·7	....	20·3	3·2	..	....
1887 : In hospital.....	210	....	548	96	..	33·4
Ratio per M....	8·0	....	20·9	3·6	..	
1888 : In hospital.....	299	....	550	83	1	31·5
Ratio per M....	11·2	....	20·8	3·1	..	
1889 ; In hospital.....	318	216	336	80	..	32·6
Ratio per M....	11·6	7·9	12·3	2·9	..	
1890 : In hospital.....	282	†	478	64	..	31·4
Ratio per M....	10·8	....	17·8	2·3	..	

The tabulation of ulcers of the penis (chancroids) with primary syphilis previous to 1885, and of primary with secondary syphilis subsequent to that year, except during 1889, introduces an unfortunate element of confusion. The number of cases of primary syphilis per thousand of strength, from 1881 to 1884 inclusive, averaged 19·4, while the number of cases of ulcer of the penis during 1885 to 1890 averaged 9·0 per cent. By a calculation of the difference of these two percentages, and of the differences of the percentages of secondary syphilis previous and subsequent to 1885, it is ascertained that the average number of cases of primary syphilis during 1885 to 1890, excepting 1889, is 7·5 per thousand, while previous to 1885 the average was ten per thousand of strength. Making the necessary allowances for the years during which cases of primary syphilis were tabulated with those of secondary syphilis, it is found that during the decade there was an average of fourteen men in every thousand of mean strength that acquired secondary syphilis, and the number of men that lost their occupation—that is, that were discharged from the service because they were syphilitic—averaged 3·4 per thousand of strength. This latter percentage shows that about one fourth of the men affected with syphilis became, in the opinion of the medical officers, unfit for the vicissitudes of military service.

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* Previous to 1885 ulcers of penis were tabulated with primary syphilis.

† For the years 1885 to 1888 inclusive, and for 1890, the heading "syphilis and results" was used instead of the separate headings, "primary" and "secondary syphilis."

‡ Days lost on account of sickness were not tabulated until 1887.

Statistics of the United States Navy.—With considerable difficulty, and not without assistance from the Surgeon-General's office, the chronology and variability in the tables in the Annual Reports of the Surgeon-General of the Navy were mastered and Table IV was prepared. Syphilis seems to be a far greater scourge to the American sailor than to the American soldier, although it is not an unjustifiable presumption that the ranks from which both services are recruited are similar in tastes and dispositions. But the sailor is exposed to more frequent and more numerous temptations that entail the possibility of acquiring syphilis than is the soldier on the frontier. In the navy, during the decade 1881 to 1890, there was an average of 18·4 men in each thousand of mean strength that had primary syphilis, and 27·9 men that had secondary syphilis. The percentage of deaths due to syphilis was quite small; while that of invaliding is large, because it includes invaliding from ships to hospitals.

TABLE IV.

Venereal Statistics, United States Navy.

YEAR.	Ulcer of penis.	Primary syphilis.	Secondary syphilis.	Invalided.	Deaths.	Average number of days in hospital.
1881: In hospital.....	135	246	299	128	1	25·2
Ratio per M....	14·1	25·7	31·3	13·4	0·1	
1882: In hospital.....	144	280	343	145	..	22·3
Ratio per M....	15·3	29·8	36·6	15·3	..	
1883: In hospital.....	131	149	305	144	..	25·1
Ratio per M....	13·1	14·9	30·5	14·4	..	
1884: In hospital.....	219	168	270	125	1	29·2
Ratio per M....	21·9	16·8	27·1	12·5	0·1	
1885: In hospital.....	362	244	434	162	..	24·7
Ratio per M....	36·2	24·4	43·4	16·2	..	
1886: In hospital.....	201	244	115	94	..	26·5
Ratio per M....	19·5	23·7	11·2	9·1	..	
1887: In hospital.....	167	161	152	73	..	27·6
Ratio per M....	17·3	16·7	15·8	7·5	..	
1888: In hospital.....	228	100	284	88	1	25·2
Ratio per M....	22·9	11·0	28·5	8·8	1	
1889: In hospital.....	118	121	290	120	1	32·1
Ratio per M....	10·5	10·6	25·8	10·6	0·09	
1890: In hospital.....	152	101	261	100	..	27·8
Ratio per M....	16·8	11·1	28·8	11·0	..	

Statistics of European and Native Armies of India.—In Table V the statistics of the European and the native armies of India are presented. From those of the former we learn that an average of 101·11 men in every thousand of strength had primary syphilis during the decade 1881 to 1890, and 33·55 men in every thousand of strength had secondary syphilis during that time; yet in the native army an average of only 10·94 men in a thousand had primary syphilis during that decade, while but 5·47 per thousand were affected with secondary syphilis. The

TABLE V.

Admissions for Venereal Diseases, European Army of India.

(From the Annual Reports of the Sanitary Commissioner with the Government of India.)

YEAR.	Ulcer of penis.	Primary syphilis.	Secondary syphilis.	Invalided.	Deaths.
1881: In hospital	....	5,376	1,352	....	..
Ratio per M.	....	92·0	23·1	....	..
1882: In hospital	....	5,013	1,327	....	1
Ratio per M.	....	87·6	23·2	....	..
1883: In hospital	....	4,835	1,304	....	1
Ratio per M.	....	87·2	23·5	....	..
1884: In hospital	....	4,992	1,352	....	2
Ratio per M.	....	90·2	24·4	....	..
1885: In hospital	....	6,972	1,638	....	2
Ratio per M.	....	122·1	28·7	....	..
1886: In hospital	2,678	7,074	2,055	....	6
Ratio per M.	43·4	114·5	33·3	1·64	..
1887: In hospital	4,255	4,830	1,875	....	1
Ratio per M.	66·6	75·5	29·4	1·60	..
1888: In hospital	4,798	4,941	2,218	....	4
Ratio per M.	70·0	72·1	32·4	1·01	..
1889: In hospital	6,293	9,299	3,549	....	6
Ratio per M.	90·9	134·3	51·2	1·32	0·09
1890: In hospital	5,769	9,198	4,497	....	6
Ratio per M.	85·1	135·6	66·3	2·92	0·09

Admissions for Venereal Diseases, Native Army of India.

YEAR.	Ulcer of penis.	Primary syphilis.	Secondary syphilis.	Deaths.
1881: In hospital	....	2,056	822	10
Ratio per M.	....	15·4	6·1	0·07
1882: In hospital	....	1,686	681	7
Ratio per M.	....	13·3	5·3	0·05
1883: In hospital	....	1,495	750	5
Ratio per M.	....	11·8	5·9	0·04
1884: In hospital	....	1,266	609	7
Ratio per M.	....	9·9	4·7	0·05
1885: In hospital	....	1,298	678	2
Ratio per M.	....	10·5	5·4	0·01
1886: In hospital	....	1,284	637	3
Ratio per M.	....	9·9	4·9	0·02
1887: In hospital	....	1,024	647	8
Ratio per M.	....	7·3	4·6	0·05
1888: In hospital	....	1,252	669	5
Ratio per M.	....	8·6	4·6	0·03
1889: In hospital	619	1,464	808	7
Ratio per M.	4·8	11·5	6·3	0.05
1890: In hospital	604	1,442	883	11
Ratio per M.	4·7	11·3	6·9	0·07

Average strength: European army, over 65,000; native army, over 130,000. The contagious disease act was abrogated in 1888.

great discrepancy of figures for the same class of men, but of different races, prompts the question, does the native race enjoy its immunity on account of lessened susceptibility, or, does the large number of European soldiers affected indicate an increased susceptibility in consequence of the debilitating effects of the climate? While the latter is not an unimportant factor in influencing the severity of syphilis, it can not be held responsible for the number of cases, as may at once be seen by comparing these statistics with those of the army of Great Britain, the latter showing that the soldier is more frequently infected there than he is in India.

At first thought it was supposed that the high ratio of primary syphilis was in consequence of the inclusion of cases of ulcer of the penis with the statistics of primary syphilis; but the separate tabulation of ulcer of the penis from and after 1886 shows that this idea was erroneous. The percentage of invaliding is less than in the United States Army, while that of death resulting from syphilis is that usually recorded.

Comparison of Army Statistics.—In the Annual Reports of the Surgeon-General of the United States Army the statistics of several foreign armies are occasionally introduced for the purpose of comparing the relative frequency of disease, death, and discharge for disability. From those tables it is possible to obtain the syphilitic statistics of the British army for several years, that may be compared with the foregoing statistics of the Indian army, and that show that the high percentage of syphilis in the European forces in India is not a matter of climate. In the army of Great Britain syphilis caused per thousand of strength, in

1887: 116·39 admissions; 0·03 deaths; 0·64 discharges.
1888: 106·52 " 0·11 " 0·93 "
1889: 92·89 " 0·03 " 1·05 "

In the army of Italy it caused in

1887: 5·68 admissions; 0·01 deaths; 0·01 discharges.
1889: 8·62 " 0·01 " 0·02 "

In the army of Prussia, Saxony, and Würtemberg it caused in

1886–'87: 8·74 admissions; 0·01 deaths; 0·03 discharges.
1887–'88: 6·30 " 0·0 " 0·04 "
1888–'89: 11·11 " 0·01 " 0·01 "

These latter statistics, meager though they be, serve to show that there is great divergence in different countries in regard to the frequency of syphilis, judging from the evidence that is afforded by the army medical reports; and therefore the probability that in one or ten thousand men a certain number would be syphilitic, would seem to depend upon the country in which the investigation is made. Presumably all armies are recruited by the admission of healthy men only; and it is for this reason that, in estimating the probability of the frequency of a disease in a civil population from the data obtained from army statistics, it would be supposed that in a thousand men taken at random and observed during a year, a certain number will acquire syphilis.

Dr. Josef Schorr published an interesting paper (Internat. klinisch. Rundschau, Wien, 1888, vol. ii, pp. 620, 668, 761, 851, 889) on syphilis as it occurs in armies, but makes his paper practically valueless for our present purpose by introducing the statistics of venereal disease in general; though there are few if any papers on this topic in which this fault has not been committed. The average from all venereal diseases (73·37 per thousand of mean strength), during the decade 1876 to 1885, is less in the Austrian army than is that of syphilis in the English army. In Dr. Schorr's paper it is stated that the statistics of 250,589 patients treated in 592 Austrian hospitals showed that 9·68 per cent were suffering from syphilis—a percentage corroborating that determined by the statistics of the United States Marine-Hospital Service.

But there is no such similarity in the figures that have been cited to show the number of cases of syphilis that would probably appear in a thousand healthy men in a year. A further examination of the statistics above cited shows that in the

English army (average three years)	105·3
European army in India (average ten years)	67·5
United States navy (average ten years)	23·5
United States army (average ten years)	11·5
Prussia, Saxony, and Würtemberg army (average three years)	8·9
Native army in India (average ten years)	8·3
Italian army (average two years)	7·2

men in a thousand are suffering from some form of syphilis. Figures that show that from 7·2 men in Italy to 105·3 men in Great Britain and its colonies, in every thousand, suffer from syphilis have a range of variation that is too wide for general statistical value, though undoubtedly they indicate the prevalence of the disease in the respective countries.

Mortality Statistics of Syphilis in England.—From the reports of the Registrar General of England for the decade 1881 to 1890 we learn the mortality statistics of syphilis in males and females per million of population, as well as the number of deaths due to syphilis in one million deaths from all causes. These figures are presented in Table VI, from which it is learned that more males than females die in consequence of syphilis. In the instance of the former sex from seventy to ninety-one, with an average of eighty persons in a million, die from syphilis, while in the latter sex from sixty-four to eighty-three, with an average of 72·8 in a million, die from that disease.

The temptation to generalize from these statistics is very great, and it does not seem to be an extravagant or unjustifiable inference that their

TABLE VI.

Mortality Statistics of England.

YEAR.	No. of deaths of males per 1,000,000 population.	No. of deaths due to syphilis in males per 1,000,000.	No. of deaths of females per 1,000,000 population.	No. of deaths due to syphilis in females per 1,000,000.	In 1,000,000 deaths from all causes there would be syphilitic deaths—
1881	19,997	87	17,813	75	.....
1882	20,676	90	18,502	79	4,310
1883	20,669	91	18,462	83	4,421
1884	20,716	89	18,473	79	4,295
1885	20,050	87	18,024	73	4,201
1886	20,341	86	18,270	74	4,152
1887	19,798	79	17,835	67	3,889
1888	18,847	70	16,806	64	3,771
1889	18,846	76	16,934	66	3,961
1890	20,836	75	18,337	68	3,657

variation is due, to an extent at least, to returns of syphilitic deaths being made under the caption of some organic lesions that are a consequence of syphilis.

If these mortality statistics are subjected to further analysis, as in Tables VII and VIII, it is apparent that the greater portion of the mortality from syphilis occurs in that portion of the population under five years of age, and of this the major portion is that of infants. Congenital syphilis is therefore largely responsible for the mortality caused by syphilis. Among males, the annual mortality of infants under one year varies from 73·7 to 79·8 per cent of the total annual mortality caused by syphilis, the average being 77·5 per cent for the decade herein recorded, while the mortality of all males under five years of age in consequence of syphilis averages but 84·35 per cent. Among females, the annual mortality of infants under one year varies from 69·6 to 74·6 per cent of the total annual mortality caused by syphilis, the average for the decade being 72·06 per cent, while that in consequence of syphilis of all females under five years of age averages 79·86 per cent of the total. And it is this first quinquennium of life that is fraught with the higher mortality in the males, for a comparison of the subsequent periods shows that the mortality from the disease in question is almost always greater among women, as may be seen from Table IX.

There is another point that may be deduced from these statistics, and that is the number of persons that are probably syphilitic in Great Britain in a decennium. There were 1,742 males over five years of age that died during that period; military statistics have shown that about one tenth of one per cent of those affected with syphilis die therefrom: so during that decade there were probably 1,742,000, or almost 175,000 males that were annually affected by syphilis. Granting that these figures are excessive because the mortality from that disease in an army is small in proportion to the number of cases, for the reason that any disability from syphilis

TABLE VII.

Mortality of Males caused by Syphilis in England.

YEAR.	All ages.	Under 1 year.	1+.	2+.	3+.	4+.	Total under 5.	5+.	10+.	15+.	20+.	25+.	35+.	45+.	55+.	65+.	75+.	85+.
1881........	1,099	845	47	10	6	4	912	2	1	9	13	40	56	32	23	8	3	..
1882........	1,158	915	63	14	..	2	994	4	3	5	12	42	41	35	15	6	1	..
1883........	1,180	942	58	17	5	2	1,024	2	2	3	11	36	42	32	18	10	..	..
1884........	1,174	930	73	16	..	1	1,020	2	2	7	11	37	42	30	15	7	1	..
1885........	1,161	904	64	12	4	2	986	6	3	1	11	46	38	32	22	14	2	..
1886........	1,168	921	73	12	3	2	1,011	5	..	1	9	38	41	33	24	5	..	1
1887........	1,095	861	52	5	..	2	920	4	2	2	11	38	37	38	25	14	4	..
1888........	984	759	39	7	3	1	809	4	2	5	14	43	42	36	22	6	1	..
1889........	1,069	802	53	15	6	1	877	..	4	4	9	46	54	35	27	12	1	..
1890........	1,049	775	57	8	3	1	842	3	5	10	7	40	54	52	25	9	2	..
Total.....	11,137	8,652	579	116	30	18	9,395	32	24	47	108	406	447	355	216	91	15	1

TABLE VIII.

Mortality of Females caused by Syphilis in England.

YEAR.	All ages.	Under 1 year.	1+.	2+.	3+.	4+.	Total under 5.	5+.	10+.	15+.	20+.	25+.	35+.	45+.	55+.	65+.	75+.	85+.
1881........	998	695	65	7	2	2	771	1	3	3	21	76	56	30	29	7	1	..
1882........	1,069	751	62	16	3	1	833	4	3	10	21	58	61	40	29	9	1	1
1883........	1,133	831	81	13	5	2	932	2	5	8	19	62	54	35	11	4	..	..
1884........	1,106	803	79	13	2	1	898	2	3	4	19	49	54	42	30	3	2	..
1885........	1,035	748	64	6	7	2	827	2	1	9	20	60	53	30	19	12	2	..
1886........	1,063	780	72	22	3	1	878	1	2	7	16	47	55	27	19	8	3	..
1887........	969	723	51	6	4	2	786	7	5	3	15	50	45	31	19	8	..	..
1888........	943	693	48	8	7	1	757	2	4	8	11	52	42	33	21	11	2	..
1889........	984	698	59	11	7	1	776	1	5	3	12	69	46	41	16	11	4	..
1890........	1,007	710	49	9	4	2	774	..	4	7	17	62	65	42	20	13	3	..
Total.....	10,307	7,432	630	111	44	15	8,232	22	35	62	171	585	531	351	213	86	18	1

that might eventually cause death would be anticipated by discharge from the service, while the general mortality that has been cited embraces all kinds and conditions of men, other data may be used to obtain the average annual infection caused by syphilis. It has been shown that the ratio which the mortality from that disease bore to the number of persons affected thereby was in the Marine-Hospital Service eighty-four hundredths of one per cent; this is higher mortality rate in comparison with the number of persons affected by syphilis than has been elsewhere recorded. Calculating with this, the 1,742 male deaths would imply 207,380 males affected by the disease, or 20,738 per annum in a population of some twenty-three million.

While recognizing the various sources of error that might make such an estimate more or less fallacious, it is based on as accurate evidence as it is possible to obtain, and it is believed that it is much nearer the truth than various extravagant estimates that have been published at various times.

If a similar calculation is made with the deaths of females over five years of age, the total estimate reaches 45,440 persons affected with syphilis annually, or about two in each thousand of population—certainly not a high figure.

TABLE IX.

Ratio of Mortality at Different Age Periods to Total Mortality.

AGE PERIOD.	Males.	Females.
Under 5	84·35	79·86
Over 5	0·28	0·21
10+	0·21	0·33
15+	0·42	0·60
20+	0·96	1·65
25+	3·65	5·67
35+	4·01	5·15
45+	3·18	3·40
55+	1·93	2·06
65+	0.81	0·83
75+	0·13	0·17
85+	....	....

The Socio-Economic Relations of Syphilis.—An important feature of the prevalence of syphilis is the influence that it exercises upon social economy, for the loss of time and of wages that it causes is not inconsiderable. In Table II it is shown that the average duration of treatment of such cases varies from 24·7 to 27·1 days. The Marine-Hospital Service averages the cost of treatment at one dollar a day; so the cost of treatment amounts in dollars and cents to the number of days the individual is treated. But in addition to this loss there is that of the wage-earning power for the same period, and as the treatment does not cost the sailor anything, and as his average wage in the American mercantile marine is something more than a dollar a day; the total economic loss is in dollars about double the number of days of complete disability.

In the army the average number of days a soldier was in the hospital on account of syphilis varied from 31·4 to 33·4 days (see Table III). As the pay of the American soldier is not as high as that of the sailor in the mercantile marine, the direct monetary loss is not so great; but here the loss of service is calculated on the basis of the number of men rendered ineffective in consequence of disability incident to disease, and from twenty-one to twenty-four men in a thousand were so rendered by this particular disease.

The records of the navy show (Table IV) that the average number of days' treatment in the hospital varies from 22·3 to 29·2 days. Here, also, the calculation is made of the number rendered ineffective by the disease, amounting to 46·3 men per thousand.

From these figures it is found that the hospital treatment of the sailor of the navy and of the mercantile marine averages respectively 25·8 and 25·9 days, while that of the soldier averages 32·4 days; or for the three services the average is twenty-eight days. As there is no evidence to show that this disease is more or less severe in these than in other vocations in general, it is believed that twenty-eight days is a fair general average of the loss of time incurred by each person infected with syphilis. This number of days further denotes that there is loss of wage-earning capacity that is proportional to the average of wages in the country for which the estimate is made, as well as a charge on the community or an expenditure of savings during the period of disability.

Influence of Syphilis upon Health and Longevity.—The influence exercised by syphilis upon health and longevity may be largely estimated by an examination of the mortality statistics. Referring to Table IX, it may be seen that there is a gradual rise in the percentage of deaths occurring at each quinquennial or decennial age period from five years to thirty-five years, when the maximum is reached in the decennalia, twenty-five to thirty-five for women, and thirty-five to forty-five for men; after these ages there is a decided decrease. As the major portion of the cases of acquired syphilis develop after the fifteenth year, these percentages show that the disease is either comparatively rapidly fatal or that it exercises but little influence on the expectation of life.

And yet the expectation of life apparently varies in different countries. In Table X there is a comparison of the percentages of deaths due to syphilis in London and in New York, in both sexes and in different age epochs.

There is a marked disparity in the evidence presented by the records of these metropoli of their respective countries; for the statistics of London conform in general to those of England (*vide* Table IX), while those of New York show a much less mortality in consequence of congenital syphilis, an excess of female over male congenital syphilis, while in the age periods over twenty years male mortality is greater than female mortality. Unfortunately, there are no national or State statistics with which these figures may be compared; but they suggest that there are social conditions in existence in England that favor the increase of syphilis in women, as well as an increase in congenital syphilis.

TABLE X.

Comparing Deaths caused by Syphilis in London and New York.

AGE PERIOD.	LONDON.		NEW YORK.	
	Male.	Female.	Male.	Female.
Under 1 year	79·8	74·7	59·1	64·0
Under 5 years	85·5	82·2	63·5	69·3
5+	0·8	0·8	1·4	1·3
20+	0·8	1·6	1·6	3·5
25+	3·9	4·3	14·0	11·4
35+	4·0	4·1	7·5	6·8
45+	2·5	3·8	6·6	4·7
55+	1·5	1·4	2·8	1·6
65+	0·6	0·6	2·0	1·1

It has often been claimed that the fact that syphilis causes many chronic diseases, especially of the nervous system, and that deaths are recorded as caused by such diseases when primarily syphilis is the inciting cause, is a large element of error in making deductions from mortality statistics in general. There is good reason for agreeing with Gowers, who says (Lettsomian Lectures on Syphilis and the Nervous System, Philadelphia, 1892): "When there is a history of syphilis, the fact that we can not trace any other cause for an existing disease does not justify us in concluding that the disease in question is due to syphilis. To do so is to treat the unknown as nonexistent, and to base our induction not on knowledge but on ignorance."

Relations to Life Insurance.—One of the most important means of judging of the influence of syphilis upon health and longevity would be the experience of the many life-insurance companies of this country. Letters were addressed to the medical directors of all the principal life-insurance companies, asking:

1. Whether the company would accept as a risk a person that had syphilis some years before applying for insurance.

2. To what extent an acceptance would depend upon the subsequent history of the individual from the time of the initial lesion, particularly in regard to treatment.

3. Whether persons so affected would be classed as hazardous risks.

4. What was the number of deaths among those insured in the com-

pany that were directly due to syphilis; what proportion these deaths bore to the total mortality; and what was the proportion of deaths (due to cerebral, renal, or other lesion) indirectly due to early syphilitic lesions.

5. Whether applicants truthfully answered the question, usually printed in the medical examiner's report, regarding the existence of early syphilitic lesions.

Of the thirty-four companies to which these questions were addressed seventeen had the courtesy to give the information desired, for which I herewith express my obligation. In reply to the first question, thirteen answered that they accepted persons that had been so affected as risks; two, that they rarely accepted such risks; and two, that such risks were very rarely accepted.

The basis on which these risks were accepted is, in general, as stated by one of the medical directors, only when there is evidence of the very best health previous to the attack; of the attack being of a mild type, of a thorough and protracted course of treatment having been carried out, and of freedom from any suspicion of recurring symptoms for several years after the initial lesion. While this is in effect the principle adopted by all the companies taking these risks, several have special rules. For example, one company only accepts such cases seven years, another company three years, after the initial lesion; another makes the number of years' interval required dependent upon the general history of the individual; another makes no effort to hunt up the past syphilitic history of the applicant, judging of the influence of the disease by the results of the medical examination made at the time of application; two others require an interval of one year following primary syphilis, of five years following secondary syphilis, while tertiary syphilis entails absolute rejection.

In reply to the third question, fourteen companies stated that a risk was either good or bad, and applicants having a syphilitic history were received on ordinary terms. One company stated that such a risk was only accepted for a fifteen-year endowment policy; one, that such risks were not accepted at the rate of an ordinary life; and one, that they were charged for as extra-hazardous.

In reply to the question regarding the experience of the company with mortality from syphilis, only two companies could furnish any figures, though all said that it was extremely small. In one there had been five deaths caused by syphilis in a mortality experience of 22,484, something more than two hundredths of one per cent of the total mortality; while in the other three were seven deaths due to syphilis in 10,952 deaths from all causes, equal to six hundredths of one per cent. These percentages are very small, and not greater than might be due to syphilis that was acquired after the policies had been issued on a healthy life.

Regarding the reliance to be placed upon the truthfulness of the answer made by the applicant, while many of the companies state that they believe a truthful answer is made, one examiner says that his "company apparently has a very virtuous set of members who have been remarkably free from venereal lesions"; and another, that "very few answer 'Yes' as to having had syphilis—so few that, if we were to judge of the prevalence of this disease by the replies which are made, we should say that syphilis is exceedingly rare in the United States."

This analysis of the replies that were received shows that the larger portion of these companies agree with the position taken by European companies, and accept such persons as have had syphilis, have been properly treated, and have had neither secondary nor tertiary lesions, as risks. The question is one of great importance to these companies, because if they accept such risks they may be acting in a manner very prejudicial to their interests, while if the rule is to reject such applicants they may voluntarily deprive themselves of a large amount of business that involves no more risk than do other or ordinary lives.

Dr. H. Mireur, in an interesting paper on syphilis in relation to life insurance (Marseilles Médicale, 1881, vol. xviii, p. 328 *et seq.*), calls attention to the fact that syphilis is a constitutional disease, that effects a vitiation of the blood and produces accidents of very variable nature and gravity. Like all and much more than some diseases, this affection differs in intensity in extraordinary proportions. There is an infinity of different degrees from that benign form that only manifests itself by some slightly appreciable symptoms and that may be cured without leaving any trace, to that severe malady that fortunately occurs infrequently in our day and that constitutes one of the most hideous diseases of the human species. The causes of these diverse phenomena are precise; science has defined them long ago, and they are indicated both by the nature of the infecting virus and by the temperament of the individual infected. Add to this primordial etiology the influence of regular treatment, well considered and well followed, as well as that of severe regimen, and there is an explanation of the differences that may be observed every day in the intensity of the disease. In the presence of these facts, established by daily observation, there is no uniform line of procedure that can be established by the insurance companies; it is necessary for them to act according to the family and the personal history of the case, and the general condition of the applicant when examined. It is a rare exception that the pernicious influence of the disease is not exercised upon the infected individual at the time it was acquired, and the statistics that have been presented show the slight influence that it exercised upon mortality.

The existing evidence regarding this matter permits the formulation of the following propositions:

1. There is no evidence that shows that syphilis has, in the great majority of cases, any direct influence upon the mean duration of life, and consequently it should not be an obstacle to insurance.

2. In cases of secondary syphilis in which treatment has been long and regularly followed without further evidence of the disease being presented, the medical examiner may safely recommend the acceptance of the risk.

3. In cases in which there have been grave or tertiary symptoms the acceptance of the applicant should be the exception and his rejection should be the rule. Such persons should be examined by two or more examiners, and should be classed as extra-hazardous risks, and for ten or at most fifteen year policies.

Syphilis Insontium.—It is a very difficult matter to approximate an estimate of the proportion of syphilitic cases that are of extra-venereal origin. Interesting as collections of cases of syphilis insontium (the *syphilis imméritées* of the French writers) may be, they only indicate the various methods other than sexual by which syphilis may be acquired. Fournier, whose experience is probably as extensive as that of any specialist in venereal diseases, says (Annal. de Derm et de Syph., 2 S., vol. viii, 1887, p. 757) that in a number of years he had treated in his office eight hundred and eighty-seven women for syphilis, forty-five of whom suffered from syphilis of nonvenereal origin. In these cases there were:

Hereditary syphilis	7
Syphilis contracted in infancy	4
" acquired by nurses from sucklings	8
" " by midwives	5
" " from nurses, etc.	12
Vaccinal syphilis	2
Syphilis from Eustachian catheterism	2
" acquired by rape	1
" of unknown but nonvenereal origin	4
Total	45

So 5·7 per cent of the total cases were of nonvenereal syphilis, and when the number of cases of hereditary syphilis is eliminated from consideration the proportion is reduced to 4·4 per cent. He further analyzed the character of the eight hundred and forty-two women, and he states that it affected—

Women living as prostitutes	366
Married women	220
Women of unknown social condition	256
Total	842

Of the married women, twenty acquired syphilis from lovers instead of from their husbands; in two, both husband and wife had syphilis, and it was impossible to say which acquired it from the other; and in thirty-four instances he could not interrogate the husband, so that there were only one hundred and sixty-four indubitable cases of wives acquiring the disease from their husbands. Of these cases eighty-two were ante-nuptial syphilitics, thirty-nine were post-nuptial, and in forty-three instances the date of infection was unknown. In one hundred syphilitic women, eighty-one belonged to the category of prostitutes and nineteen to that of married women: so Fournier concludes, with sarcastic humor, that four fifths of the women acquire, if the expression is pardonable, syphilis honestly.

It is therefore apparent that this syphilographer, living in a metropolis where the opportunities for his investigations in this regard are unsurpassed, attaches but small importance to the influence that extra-sexual infection exercises upon the prevalence of the disease. And this experience is undoubtedly that of most physicians; Fournier's percentage of this form, if form it may be called, of syphilis being undoubtedly higher than the real percentage is because he is oftener consulted by persons so affected than is the general practitioner. Personally the writer would state that he has attached but little importance to the denials of hospital patients of the sexual origin of chancres that were of recent origin, notwithstanding their statement of some long-past date as the last time of their indulgence in sexual congress; and it is believed that evasion and prevarication in this matter is not a rare experience with most hospital physicians.

Relation of Syphilis to Marriage.—It has been considered that the greatest danger that syphilis possessed for others is the infection of the wife by the syphilitic husband. The problem of the duration of the syphilogenic capacity in relation to marriage is one of the most important questions that the syphilographer is called upon to decide.

The entire question rests upon the curability of syphilis, for if that disease may be cured, it is safe for the person that was infected to marry; and if it is an incurable disease, then risk is always run. Here, again, there is a wide diversity of opinion, for Gowers says (Syphilis and the Nervous System, 1892): "There is no real evidence that the disease ever is or ever has been cured, the word 'disease' being here used to designate that which causes the various manifestations of the malady. The short statement that 'syphilis is an incurable disease' is legitimate, if we recognize that 'incurable' means that there is no proof of cure. . . . No treatment, however thorough, will bring syphilis, as a disease, to an end, so that the patient does not suffer again from any of its direct effects." Most syphilologists agree with R. W. Taylor (article "Syphilis," Hare's System of Therapeutics, 1892), that "if an energetic and thorough treatment be followed for two years or two years and a half, the patient will be cured, as shown by the enjoyment of good health, by freedom from all syphilitic manifestations, and by his or her ability to procreate healthy children." Though Fournier, in his classical *brochure* on Syphilis and Marriage, says, "Three or four years methodically devoted to an energetic medication—such, in my opinion, is the necessary *minimum*—I will not say to cure the disease, but to avert its dangerous manifestations both for the present and for the future," apparently agreeing with Gowers's position. Elsewhere in this volume this question of the curability of syphilis has been discussed *in extenso*, and it is not germane to the topic here under consideration; all authorities agreeing that after prolonged treatment, if there are latent foci of infection, they remain in abeyance, and *pro tanto* the patient is cured.

In the question of the relation of syphilis to marriage there is involved the danger of syphilis to the healthy wife or husband, and the danger to the children.

Fournier has emphasized the conditions that must be required in order to permit the marriage of a syphilitic subject. They are: First, the absence of existing specific accidents; second, the advanced age of the diathesis; third, a certain period of absolute immunity consecutive to the last specific manifestation; fourth, nonthreatening character of the disease; fifth, sufficient specific treatment. In view of the subject-matter of other sections of this work, it does not seem advisable or necessary to here present the reasons for the acceptance of these facts.

In considering the advisability of recommending, or rather sanctioning, the marriage of a person that has been infected, not only should the preceding facts be ascertained and carefully weighed, but it would be well to review the theses formulated by Morrow (Journal of Cutaneous and Genito-urinary Diseases, 1887, vol. v, p. 126):

"1. The facts of every-day observation show that there is nothing constant in contagion, nothing certain in heredity. Men marry with syphilis in full activity of secondary manifestation, and never infect their wives or transmit the disease to their offspring. These negative observations are, however, entirely valueless as a basis for estimating positive results.

"2. The modern division of syphilis into secondary and tertiary periods, based upon anatomical forms and processes, does not furnish a safe criterion for determining the contagious or noncontagious character of the lesions.

"3. The chronological completion of the secondary stage does not always mark the definite disappearance of the virulent principle; clinical experience shows that late lesions are exceptionally, but none the less certainly, the source of contagion.

"4. While in the immense majority of cases the contagious activity of syphilis and its susceptibility of hereditary transmission cease after the third or fourth year, yet well-authenticated observations prove in the most positive manner that these qualities sometimes continue in force much longer, and may be manifest in the fifth or sixth year of the disease, or even later.

"5. The aptitude of syphilitic parents to procreate diseased children may persist after the cessation of all specific manifestations; the contagious stage of syphilis is not, therefore, the exact measure of the duration of hereditary influence.

"6. The precise date in the evolution of the diathesis, when the syphilitic organism undergoes that radical transformation which marks the limit of its contagious or transmissive power, does not admit of mathematical expression.

"7. It is probable that this limit varies in different cases, and that many circumstances contribute to advance or defer it.

"8. The type of syphilis, the constitutional peculiarities of the patient, the character of the treatment, the presence or absence of certain conditions which are recognized as factors of gravity in syphilis, all exert a modifying influence.

"9. All these elements should be taken into consideration in deciding upon the admissibility of a syphilitic man to marry; each case should be studied upon its individual merits.

"10. The direct paternal transmission of syphilis without preliminary infection of the mother may be classed among the most conclusively established facts of medical science.

"11. It is, therefore, a dangerous doctrine to teach, that the sole risks a syphilitic man introduces into marriage consist in the contagious accidents he may bear upon his person.

"12. The arbitrary designation of a limit of three or at most four years, as perfectly safe for a syphilitic man to marry, with or without treatment and irrespective of the actual existence of specific lesions, is unwarranted by science or the teachings of experience."

Demographic Relations of Syphilis.—In the United States the question of the relation of syphilis to race should be studied in regard to its prevalence among the Indians and the negroes.

There are many vague references to the decimation of the Indian tribes in the past and present centuries by the ravages of syphilis. Dr. Lake, in a paper on this subject in the Philadelphia Medical Register, says that syphilis is rare in certain tribes, as the Indians are syphilized; but there is a large field for investigation in this particular.

In a study of the comparative frequency of disease in the white and colored races, published in the Annual Report of the United States Marine Hospital Service for 1886, the writer found that in a series of hospital patients there were 403 whites and 525 negroes; in there were suffering from

Syphilis, secondary	17 whites,	20 negroes.
" tertiary	2 "	3 "
Total	19 (4·7%),	23 (4·3%).

There were treated in the dispensary, in the same period, 1,598 white and 1,311 negro patients; among these were

Syphilis, primary	9 whites,	18 negroes.
" secondary	85 "	77 "
Total	94 (5·9%),	95 (7·2%).

In the army, in the decade 1880 to 1889, the admissions to the hospital on account of syphilis were, among the white troops, 34·87 per thousand of mean strength, and the discharges from the service were 3·47 per thousand; among the colored troops the admissions were 51·98, and the discharges from the service 4·58 per thousand of mean strength.

Dr. H. R. Carter, in a careful study of the manifestations of syphilis among negroes (Annual Report of the Marine Hospital Service, 1883), concludes that it pursues a milder course in that race than in the white. It is marked by but few cutaneous lesions, and these mainly pustular; the mucous membrane is very rarely and then but slightly affected; nodes and periostitis are rare; caries and deep ulceration are rare in early syphilis, although the synovial membranes are much more vulnerable.

Dr. I. E. Atkinson (Maryland Medical Journal, 1877, vol. i, p. 135) considers that there is a marked predisposition toward the return of symptoms, and constant vigilance in meeting them must be exercised.

Personally my experience coincides with Carter's, that the prognosis of syphilis in the negro is even better than in the white, and that a residuum of immunity to the severer lesions of this disease must be ascribed to racial peculiarities. This conclusion is in part borne out by the opinion of Chassaniol regarding the negro in Africa. He says (Archives de Méd. Navale, 1865, tome iii, p. 505), tertiary lesions are much less frequently observed among the negroes of Senegal than among Europeans.

Syphilis has been introduced into all the countries of the world, but its propagation depends largely upon the characteristics of the population. Certain countries seem to be remarkably exempt. Jacolet (Thèse de Paris, 1861) states that syphilis is quite rare in Iceland, even in Reikiavik, where there is a mixed population and where exotic cases have been observed; Lesser (Archiv f. Dermatologie u. Syphilis, 1891, No. 1, p. 37 states that Dr. Schierbeck, of Reikiavik, informed him that this imm nity of the Icelanders was due to the scattered character of the popul tion, the absence of prostitutes or houses of prostitution, and the virtuous character of the inhabitants.

Gras states (Thèse de Montpellier, 1867) that in Miquelon, while syphilis had been introduced by the first inhabitants, it had never secured a foothold, and in an entire generation he had never seen a case.

H. Rey states (Annales de Dermatologie et de Syphiligraphie, second series, vol. i, 1880) that in Spain, in consequence of the lack of hygienic measures, syphilis had many victims, especially in the meridional regions. At Malaga there were 182 cases of syphilis treated in the hospitals per thousand patients suffering from all diseases; while in the English garrison at Gibraltar there were only 84 cases of syphilis in each thousand patients. In Portugal there were 135 cases of syphilis to each thousand of general diseases in the army. Yet the sanitary statistics of Barcelona for 1888 show that the mortality caused by syphilis is but 18 per thousand of population.

According to Dr. Schneppe (Du Climat de l'Egypte, 1862) there were in the European hospital at Alexandria, from 1844 to 1861, 71 syphilitic patients in each thousand with all diseases. In the Somerset Hospital, Cape Town, from 1871 to 1874, there were 100 syphilitic patients in each thousand with all diseases.

While in China Dr. Galle states (Thèse de Paris, 1875) that there were in the general hospital at Shanghai 191 cases of syphilis in each thousand cases treated, he also says that syphilis presents a malignancy there that is not without danger, in view of the debilitating influence of the climate.

In general, it may be said that tropical syphilis is more dangerous to the European on account of the anæmia to which his residence in hot climates subjects him. In such climates the evolution of the disease is more rapid, the secondary eruption often appearing in half the period, after the initial sore, that it occurs in temperate zones.

The ravages that syphilis has caused among primitive people, such as the natives of the South Sea islands, is not to be attributed to any predisposition on their part, but to the same causes that made syphilis such a devastating plague in the sixteenth and seventeenth centuries. As Henry Lee has said (Transactions of the International Medical Congress, London, 1881), when any contagious disease affects a population for the first time it is generally more severe than at any subsequent period, and it is often more virulent in a place where it is not bred than in a place where the people have almost trained themselves to an immunity from it. After a time, which may be longer or shorter, the disease diminishes in intensity and becomes of a milder character, and in some instances dies out.

If there is any immunity enjoyed by any race, it is due to the fact that that race is not brought into contact with those that are infected, or that there is not that debility of the system caused by alcoholic or venereal excess, or that there is the influence transmitted by the syphilization of ancestors.

Occasionally what seems to be an extravagant statement is made regarding a country. Thus Blanc says (Transactions of the Medical and Physiological Society, Bombay, 1870) that in Abyssinia syphilis is so prevalent that nine tenths of the inhabitants are more or less affected with the disease; every individual, male or female, has had, has, or will have syphilis! Obviously such a statement must be regarded with great caution, being based upon no definite record of a number of examinations of supposedly healthy persons.

So, also, must caution be shown in accepting the statements of travelers that are not medical men. Palgrave, for instance, has been accepted as the authority for the statement that syphilis is frightfully common in Arabia—a statement that is unsupported by any evidence that enables the reader to judge of the frequency with which it occurs or the severity of its manifestations.

Occasionally local epidemics of syphilis have occurred similar to that in Fiume, and that was referred to as the *mal de Fiume*, or *Scherlievo*, from the name of the village in which it first appeared. In that instance a contagious disease appeared in 1800, and lingered throughout Istria and Dalmatia until 1855; it presented many of the symptoms of syphilis, and has been thought to be that disease propagated by ordinary social intercourse. In 1867, in Capistrello in Abruzzo, there was an endemo-epidemic of syphilis that lasted eight years. In a report upon it (Annales de Dermatologie et de Syphiligraphie, 1869, vol. i) the statement is made that it was started by a woman of that locality who had nursed a strange syphilitic infant, and in a population of three thousand more than three hundred became syphilitic. It is also said that at Colihera, in the province of Bellene, fifty persons were affected by syphilis from a similar source.

Podolinsky (Compt. rend. du Congrès Médicale de Montpellier, 1869) stated that syphilis is particularly grave in the neighborhood of the Baltic, in Podolia in Kazan, in Siberia, and in Kamchatka. He states that in the interior of Russia the governments of Kief, Pultava, and Ternigon suffer most. In the former the author knows villages in which all classes of the population are infected; and he instances the village of Jeroslawka, in which there were one hundred and twenty families, thirty of which were known to be syphilitic, while only sixty-four could be affirmed to be exempt.

Prostitution and Syphilis.—With our knowledge of the means by which this disease is transmitted, as well as of its independence of climate, soil, water, or food—the factors that are potent in disseminating other infectious diseases—the study of the geographical distribution of syphilis becomes more a matter of interest than a source that permits deductions regarding the means that are necessary to secure the control of or to eradicate the disease. Almost all propositions for the restriction of syphilis are based upon the supervision of the most usual method of its dissemination—prostitution. Reference has been made to the belief, prevalent in many countries, that the disease is propagated by ordinary social intercourse; but such a theory would not gain wide credence among scientific men to-day, because it is not our experience that syphilis is otherwise than rarely spread by mediate contagion; and if prostitution did not exist in those localities that suffered from endemo-epidemics of syphiliform disease, it is quite probable that clandestine sexual intercourse served as a disseminating medium for syphilis.

Repressive Measures.—Occasionally a severely radical measure has been proposed, as by Dr. G. F. French (Transac. Maine Medical Society, 1878), who would stamp out syphilis by extirpating, in those affected, the sexual organs. Argument as to the futility of such a proposal is needless.

The American Public Health Association appointed a committee to consider the subject, and it was proposed that a law should be enacted that would make it a criminal offense to knowingly communicate, directly or indirectly, or to be instrumental in communicating, a contagious disease, such as smallpox, scarlatina, or venereal diseases; and giving to boards of health, and to State and municipal health officials under their control, the same power of preventing, detecting, suppressing, and gratuitously treating venereal diseases that they now possess in the case of smallpox or other contagious diseases.

An idea of the comprehensive measures that have been suggested may be obtained from Dr. M. E. da Cunha Bellem (Trans. Int. Med. Cong., London, vol. iv, p. 454), in which he alludes to syphilis as the greatest evil that afflicts humanity, and urges that all measures should be employed to exterminate that evil, advising an international convention for the purpose of devising the means for generally and efficaciously combating it. As coitus is not the only means of acquiring syphilis, inquiry and inspection of those that are suspected of being syphilitic do not imply dishonor, humiliation, or blame. Inspection, examination, and enforced hospitalization are the only means of preventing the propagation of syphilis. Inspection should be made of all prostitutes, of soldiers, of sailors, of police, of workmen in fabrics, of the entire *personnel* of a regiment when it arrives in a town, as well as that of a vessel when it arrives at a port. No patient may leave a hospital until cured of syphilis. Physicians will denounce to the police those whose visages indicate syphilitic taint, and such persons shall be immediately inspected. Pharmacists shall denounce those who apply for specific medicines. Midwives shall call in physicians when they suspect an infant of being syphilitic. Men and women shall denounce those that gave them syphilis; if the woman has a good reputation, the authorities should proceed with the greatest care, and severely punish any false allegation. All pederasts must be kept under police observations. No person shall marry without presenting a certificate that they are free from syphilis, well-connected persons rendering an enormous service to humanity by facilitating these examinations. To have syphilis is a misfortune, not a crime; to knowingly transmit it is a criminal act against humanity.

The Regulation of Prostitution.—At a meeting of the Royal Academy of Belgium, on October 29, 1887, these resolutions were adopted:

1. The Belgian Royal Academy considers that the regulation of prostitution is necessary to restrain the development of venereal diseases and of syphilis.

2. Prostitution that advertises itself in the streets and public places, being the most potent cause in the propagation of venereal diseases and syphilis, should be interdicted.

3. Persons convicted of living by habitual prostitution should be inscribed and subjected to sanitary visits.

4. Registration and medical visits should only be authorized under safeguards that would, under each and every circumstance, protect the honor and dignity of the person.

5. From the exclusive standpoint of public health the Academy declares that frequent and conveniently administered sanitary visits constitute the most efficacious means of arresting the propagation of venereal diseases and syphilis.

Registration in France.—France has been regarded by many that have paid attention to the subject of the regulation of prostitution by the State as the country that had laws calculated to limit venereal disease. But Barthélemy states, in a paper on the public prophylaxis of syphilis (Annales de Dermat. et de Syphilig., 2 S., vol. ix, p. 721), that it is generally known that the sanitary service of Paris is in a most deplorable condition, being conducted without vigor or regularity, and that it should be completely reorganized. That there was a general recognition of this fact was evidenced in the discussion at the Paris Academy of Medicine (Bulletin Acad. de Méd., 1888, vol. xix, pp. 155, 248, 291, 354, 410, 424, 464), and the adoption in April, 1888, of conclusions calling the attention of the public authorities to the increase in solicitation in public places in recent years—this solicitation not being confined to the streets, but occurring in shops, especially those in which wine and beer are sold, and also extending to lyceums and colleges, thus exciting minors to debauchery. The consequence of these various modes of solicitation is the dissemination of syphilis, and public health demands the registration and weekly inquisitorial visitation of all women that live by prostitution. If a woman will not consent to registration, it should be imposed by judicial authority, and any woman found diseased should be confined in a special hospital. Hospital facilities for treating venereal diseases should be increased by special wards; the medicaments necessary for treating such diseases should be furnished gratuitously in all hospitals.

Further efforts should be made to reach those affected by gratuitous consultations in dispensaries attached to all hospitals. In all provincial towns there should be special services for the treatment of venereal diseases. The venereal services at all hospitals should be freely opened to medical students, and no student should be permitted to graduate that has not a certificate of service in a venereal clinic.

Barthélemy argues that no one is under any legal obligation to be a prostitute; but if any one has the right of disposing as she pleases of her body, it is necessary that this merchandise, like all other, should not damage the consumer nor constitute for him a cheat or a peril. With this, as with other things, it is too late to act when the evil is done; it is therefore necessary to prevent it in the beginning. He would say, *en passant*, that it is infamous and shocking to qualify these venders as venders of love, as do certain euphemistical writers; they are rather venders of pleasure, or, better, of enjoyment. Society is under the necessity of exacting the healthiness of these venders. He considers that freedom of prostitution encourages debauchery, and that it is at the same time a grave public danger.

That the law regulating prostitution has utterly failed in accomplishing in France the ends that were intended, is shown by Barthélemy in his work on Syphilis and Public Health, in which he says that one hundred thousand women live by prostitution in Paris, while but four thousand are registered. He states that of 1,932 unregistered women arrested in 1888, 680 had venereal diseases, and 262 of these were syphilitic maladies. In 47,371 visits paid during the year to the dispensary by registered prostitutes, 143 cases of venereal disease were found, 56 of which were syphilitic; while to registered women, arrested in public places, 14,574 visits were made, and 195 cases of syphilis found in 314 cases of venereal disease. There were 42,795 visits made to brothels, and in 100 cases of venereal disease 54 were syphilitic.

In the Transactions of the International Congress of Dermatology and Syphilography, held in Paris in 1889, Dr. Butte publishes a careful study of the statistics of the results of the inspection of prostitutes in Paris during the thirty years 1859 to 1888. He has tabulated the number of each of the three classes of prostitutes that were seen during the year, giving also the number in each class that were found syphilitic. These results he has finally arranged in a diagram that is reproduced in Fig. 1. During 1870 and 1871 the inspection service was apparently in abeyance, presumably on account of the Franco-Prussian War. The author considers that only approximate results are shown, because the unregistered women are seen but once, while the prostitute in a brothel is seen fifty-two times a year; as either can only, as a rule, have syphilis once, this argument falls to the ground.

Apparently there has been since 1873 a constant diminution in the proportion of syphilitics among prostitutes in brothels, though the sanitary inspection service has not eliminated it, and in the nature of existing conditions can not do this. There has been an irregular but none the less evident decrease in the number of syphilitics in the other two classes of prostitutes; though Butte thinks that this is fallacious, and that the number should be increased, frankly acknowledging, as did Barthélemy, that sanitary inspection did little in reducing the number of syphilitics among these classes. If the latter statement is so, then there must be many syphilitic women that are not reached by the regulations now existing in Paris.

The statistics are further verified by Dr. O. Commenge (Recherches sur les Maladies venériennes à Paris, dans leur Rapports avec la Prostitution clandestine et la Prostitution réglementaire de 1878 à 1887), who, in an experience of ten years, found that of

Prostitutes registered by cards	7·3 per cent
" in houses	12·0 "
Clandestine prostitutes	16·69 "

were suffering from syphilis.

Registration in Russia.—It can scarcely be said that the provisions of the law have been sufficient to reach the classes that are most dangerous to society in spreading syphilis. But that France is not singular in this respect may be learned from the elaborate study by Dr. E. Schperk (Annales d'Hygiene publique, 1875, vol. xliv, pp. 42 and 292) on the prevalence of syphilis in the feminine population of St. Petersburg. In that city, as in Paris, the law regulating prostitution seems to have failed in accomplishing its purpose, and Schperk considers the statistics of prostitutes registered in houses, of prostitutes registered by cards, and of clandestine prostitutes. He found that 34·2 per cent of those in houses, 40·1 per cent of those registered by cards, and 42·4 per cent of clandestine prostitutes were syphilitic. His statistics show that a prostitute may remain free from syphilis for a brief period, but, unfortunately for her and for society, it is very brief; she is early infected, and then becomes during a year and a half to three years, according to the

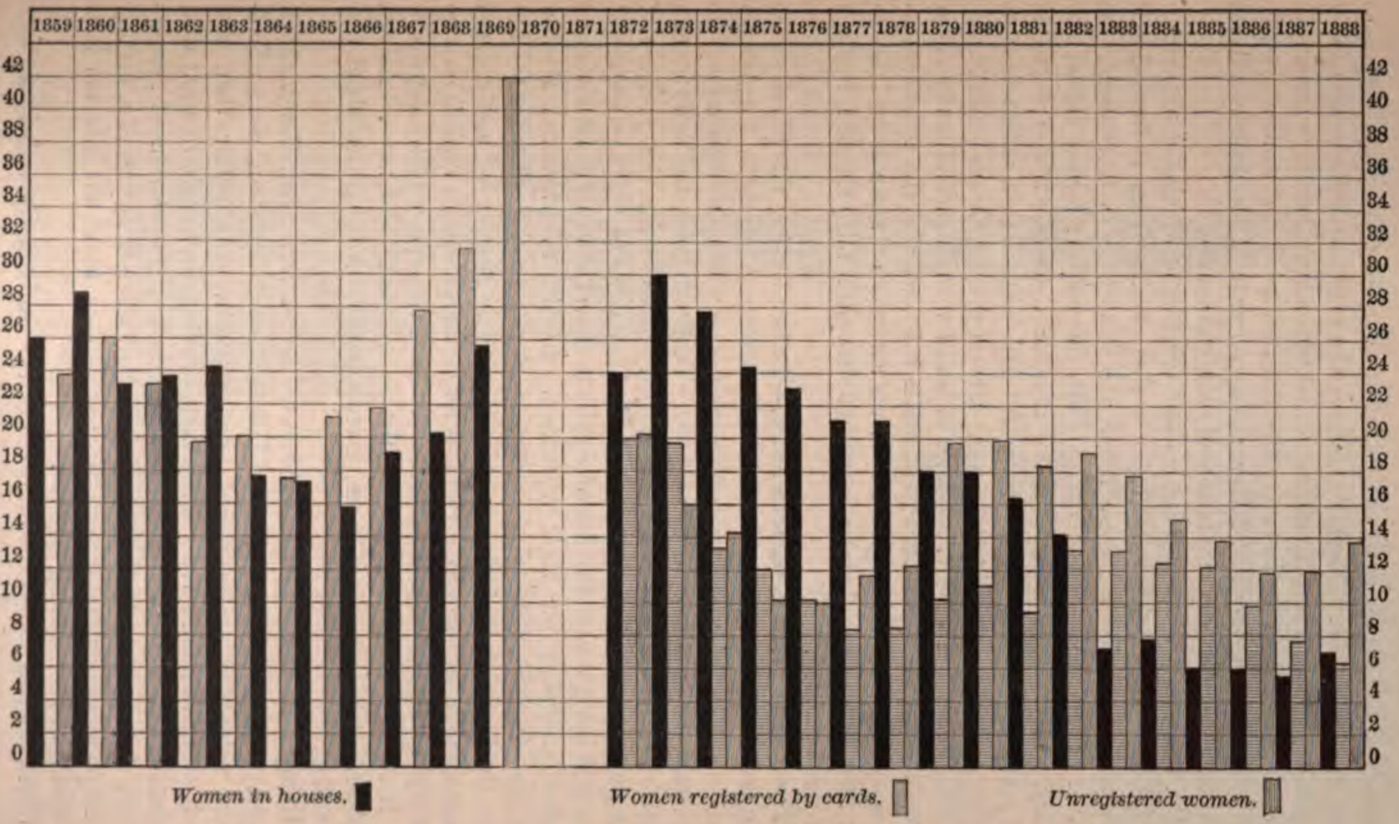

FIG. 1.—Diagram showing the annual percentage of syphilis in the three categories of Parisian prostitutes.

character of her constitution and its infection, one of the most dangerous members of her class. Notwithstanding the most careful surveillance of the sanitary police, notwithstanding all the conscience that the woman may have (supposing that she has any), she will inevitably communicate syphilis during the first days that follow the appearance of the primitive lesion and during the first days that succeed each recurrence.

Dr. Schperk presents a graphic chart (Fig. 2) in which the number of prostitutes in each quinquennial age period from fifteen to forty-five is represented by columns; these latter are shaded, so as to represent the number of prostitutes free from syphilis, the number having initial, secondary, and tertiary lesions, and the number that have had syphilis but that present no manifestations thereof. This shows that, with a few exceptions, after the age of twenty-five years all prostitutes are syphilized.

This deduction of Dr. Schperk is based upon a careful study of the material under his observation; and while it is true that the prostitute acquires syphilis in spite of rather than on account of these laws, it seems that these latter have signally failed to accomplish the purpose for which they were enacted.

The Contagious Diseases Acts.—Before leaving this phase of the question of the limitation of syphilis by statutory provision for the inspection and isolation of infected prostitutes, it will be well to survey the experience of England in this matter. In 1864, 1866, and 1869 certain contagious diseases acts were passed by Parliament for the purpose of lessening venereal disease in the army and navy, the essential principles of these acts being a combination of hygienic surveillance of prostitutes and hospital provision for their treatment. At the International Medical Congress of 1881, Clifford Allbutt said that these acts became the law under the idea that syphilis would be checked in its progress and reduced to manageable proportions. But this hope had not been fulfilled, because true syphilis appeared, according to statistics, to have actually increased, and it had certainly increased in the British army and navy. Allbutt considered the acts mischievous, useless, and thoroughly one-sided and degrading.

Henry Lee said of such legislation (Trans. Int. Med. Cong., 1881, vol. iv, p. 470) that if sufficient hospital accommodation were afforded the voluntary system would, on the whole, work better than that which obtained under the surveillance of the police. He thought that, whatever advantages may be claimed in favor of the operation of the contagious diseases acts in making a protected district apparently orderly and in preventing annoyance to the public, they have not hitherto been the means of diminishing syphilis.

Corroborating this is the evidence of the Sanitary Commissioner with the Government of India (Report of 1881), who said that for a number of

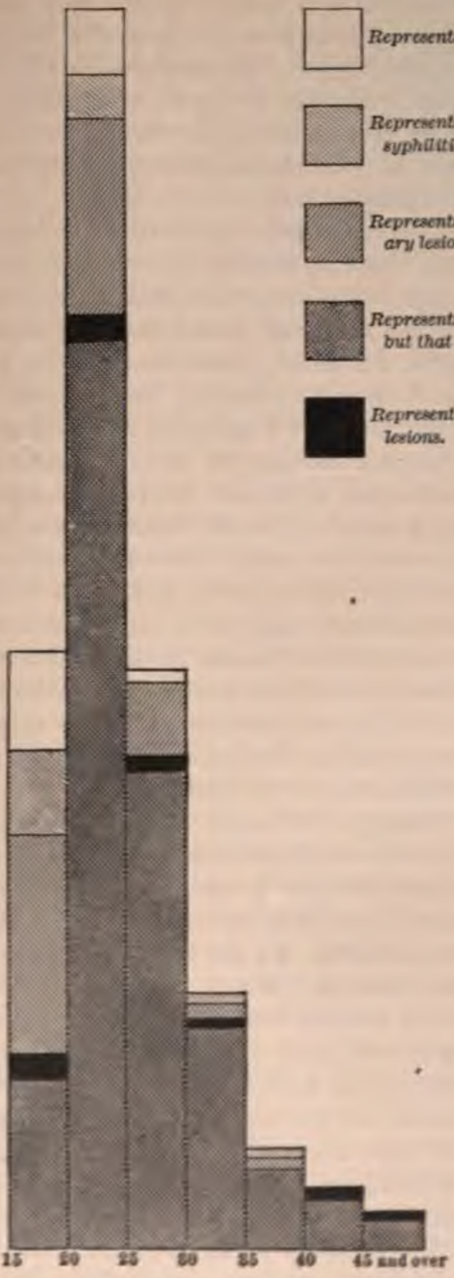

FIG. 2.—Proportion of syphilitic women in St. Petersburg prostitutes, arranged according to quinquennial age periods. The heights of the columns indicate the number of prostitutes in each quinquennium.

years the lock-hospital system had been very generally enforced in the cantonments of the three presidencies, but that year by year it became more and more evident that, however successful such a system promised to be when it was originally adopted, its practical working in India had proved a complete failure, because during the twelve years that the contagious diseases acts were in force in that country hospital relief for venereal diseases had been as great as ever.

Dr. J. Birkbeck Nevins read a paper before the Seventh International Congress of Hygiene, in which he presented the statistics of the fourteen stations that had been put under the provisions of the contagious diseases acts for six years before the acts were passed, for the sixteen years (1866 to 1882) of their operation, for three years during which the acts were suspended, and for the four years following their repeal. These show that there was an annual fall of 6·7 per cent from 146 to 87 per thousand strength, in the number of cases of primary venereal sore from 1860 to 1866; this reduction continued from the passage of the acts until 1875, when the low ratio of 33 per thousand was reached. But from 1875 until 1883 there was a steady rise, until there were 138 cases per thousand of strength during the last seven years of the acts, the rise being 27·7 per cent annually. Following the suspension of the acts, or in 1884, the ratio commenced to fall, and has continued to do so at the rate of 7·8 per cent annually until 1889, the last year recorded.

Dr Nevins, however, failed to state whether similar curves existed in the records of secondary syphilis. The Lancet stated editorially (July 20, 1889) that at the fourteen stations at which the acts were in force the ratio of syphilis per thousand of strength was, in 1881, 27; in 1888 it had increased to 42, the acts being suspended about May, 1885. From 1881 to 1884 the numbers fluctuated, being respectively 27, 22, 25, 25. In 1885 the ratio was 26, while the numbers for 1886, 1887, and 1888 were 32, 45, and 42 respectively. In the several districts the increase seems to be even more marked. The ratio rose in Devonport and Plymouth from 21 in 1884 to 39 in 1885, 51 in 1886, while in the years 1887 and 1888 it was 49 and 41. At Portsmouth the ratio was 20 in 1884, and in 1885 it was 15. In 1886 it had risen to 42, while in 1887 it was 72; in 1888 it was 59. In the Chatham, Sheerness, and Gravesend combined district it rose from 22 in 1884 to 41 in 1888. At Woolwich the ratio was also 22 in 1884, but it rose in the following years to 28, 39, and 49, and in 1888 was 31. At Aldershot it fluctuated, the respective ratios from 1884 to 1888 inclusive being 34, 23, 30, 47, and 52. At Windsor it increased progressively from 28 in 1884 to 61 in 1888. At Shorncliffe the ratio rose from 18 in 1884 to 70 in 1885, since which it had been 38, 37, and 30. At Colchester it fluctuated from 29 in 1884 to 48 in 1888. At Canterbury the fluctuations were from 20 in 1884 to 68 in 1887, and 66 in 1888. At Maidstone the ratio was 39 in 1884; in 1887 it had risen to 69.

Other Measures to limit the Spread of Syphilis.—It must be conceded by all that those that have opposed the enactment of legislation directed to the sanitary surveillance of prostitutes have been prompted by honest motives, having no intention of belittling the importance of syphilis. But it has been considered that an analogous argument to that used in favoring such legislation would be to urge that all children's nurses should be licensed and subjected to examination at fixed periods, because they might be the source of tuberculous infection—a plan that would be inapplicable as well as ineffective.

At first thought the measures that should be adopted to control and eradicate syphilis seem very easy of application. Being a disease that is almost always transmitted by immediate contagion, the segregation and treatment of infected individuals would solve the problem. If it were possible to secure the isolation and detention of all infected persons from the time of and for at least three years following the appearance of the initial lesions, it might be possible to limit the spread of syphilis. But the experience of France, Russia, and England has shown that it is impossible, with any repressive regulations that have been adopted, to materially diminish the ratio of syphilitics among prostitutes. And when the impracticability of isolating and supervising other contagious diseases is considered, it may be appreciated that, however possible it might be by confining all persons affected with syphilis in an infective stage to almost if not completely exterminate that disease, the method is not feasible, particularly in a country where the assumed rights of the individual are as jealously guarded as they are in the United States.

Caveat emptor is the maxim of the market place; and if the conditions of society are such that the struggle for existence obliges many women to dispose of the use of their bodies to any purchaser, then let the buyer beware. There is no obligation that society should protect him, and there is no evidence that the injury he does or may do to innocent persons should demand legislative action looking toward securing such protection. The evidence that at least four fifths of the women that acquire syphilis do so as a consequence of their own viciousness or folly, as Fournier's heretofore quoted statistics show, disposes of the necessity for the exhibition of much sentimentality in their behalf. In matters of this sort it is necessary to proceed on a basis of fact and not of impression on the evidence that is afforded by collated experience rather than the sad details of a few cases of syphilis insontium that may come within the ken of some physician.

The sale of alcoholic beverages is licensed, but despite that fact and the existence of laws regulating disorderly conduct, the purchaser and user of these commodities is more likely to injure the innocent than is the acquirer of syphilis. Which of our cities guarantees the purity of its water supply, or even adopts the measures that are necessary to prevent its contamination by sewage discharge or seepage?—and yet typhoid fever is more prevalent than syphilis. Which of our States guarantees the purity of the animal foodstuffs that are sold, or even efficiently supervises the sanitary character of these products?—and yet tuberculosis is a hundred times more dangerous than is syphilis.

Barthélemy has acknowledged that the most comprehensive regulation of prostitution will not suppress all syphilis, and makes the analogy that the laws against theft fail to stop thieving, though crime of that character is undoubtedly diminished in consequence of the existence of such laws. But the disparity in the character of the two kinds of specified legislation is evident when we consider that the laws against theft apply to the sole individual guilty—the thief; while the laws regulating prostitution apply to but one of the parties guilty of disseminating syphilis. That Barthélemy recognizes this fact is shown (Comptes Rendus de la Congrès Internat. de Dermat. et de Syphilog., 1889, p. 787) by his statement that prostitutes, in all good faith, do not always recognize the gravity of syphilis. They see the facility with which this disease is acquired by themselves; in their eyes the impunity of the man that is so affected is too evident: so why should they imagine that they commit a fault when they in their turn transmit it? He acknowledges that clandestine prostitution makes incessant progress, though this increase he attributes to official negligence. Yet public brothels offered no more security than chance or clandestine prostitutes; and, in consequence, a new vice had arisen—prostitutes acknowledging that but a small proportion of men purchasing their favor proceeded by natural passages. This viciousness has extended from France to the United States, and the information that one acquires regarding both the women and men of this stamp indicates the existence of depravity that would make it desirable for syphilis to be a rapidly fatal disease that would wipe these sexual perverts out of existence.

Barthélemy would have all syphilitic women immured in a convalescent establishment outside of the city while the contagious period of the disease existed; while there they could pass the time in receiving professional instruction that would fit them to follow some trade when they were discharged from treatment. Prostitutes that had had syphilis at least five years, and that had been properly treated, might be exempted from the biweekly visits. This proposition ignores the fact that, notwithstanding the possibility of secondary syphilitic infection, there is the further possibility that such syphilized women might be the medium for transmitting the disease without being infected themselves. He also suggests that premiums should be accorded to all the women that had been, during the year, punctual in making their visits to the sanitary inspector; and it would also be well to give premiums to women that, finding themselves diseased, reported without delay to the inspector.

Barthélemy recognizes the one-sided feature of dealing with the women alone, and suggests that men entering a house of prostitution should be examined by the matron, so that all that are diseased can be eliminated. He might go further, and demand that all patrons of these institutions should be supplied with cards certifying to their sanitary condition that they should present to the woman when they examine the last inspection date on her card. He realizes the lack of scruple that most of these men have in visiting women while suffering from some form of venereal disease, one expressing the sentiments of many when remonstrated with for such action. "I will pay them back," he said; "it is their business to chance and risk pox, as it is the soldier's to risk bullets." Most American physicians that have had any venereal practice will recognize that the type is not singular to France or to Europe.

In consideration of the history of the contagious and infectious diseases both in Europe and America, the statement may be ventured, without fear of contradiction, that typhoid fever or tuberculosis may be more easily prevented than syphilis, dependent as the latter is upon so many as well as such uncontrollable factors, some of which include the human characteristics of the want or frailty of the woman, the viciousness of the man.

One of the first and the most important means that should be adopted to decrease syphilis is a general regulation by all hospitals permitting the free admission of all syphilitics that apply for treatment, and particularly of those infected with the primary sore. It would be impossible to estimate how much these institutions have done in the past to increase the prevalence of the disease in question by refusing admission to such patients. In States and municipalities where there is an allotment of public funds for the support of hospitals, such an allotment should be refused any institution that discriminates against syphilitic patients.

It should be the rule in all hospitals to admit and discharge syphilitic patients at their own request, subjecting them only to the general disciplinary regulations of the institution. In some European hospitals, where the custom prevailed of requiring that a patient so affected should sign a voluntary undertaking not to leave the hospital without the consent of the medical superintendent, the abrogation of even this regulation has served to increase the number of syphilitics that apply for treatment.

As germane to this latter self-evident proposition is the desirability of the establishment in all large cities of special hospitals for cutaneous and venereal diseases, or the assignment in general hospitals of special wards for the reception of such patients. Necessarily, such wards should be under the care of one well versed in these diseases. All dispensaries should include special services for cutaneous and venereal diseases.

It is generally credited that St. Augustine said that if prostitutes were suppressed, society would be inflicted by libertinism. It is this principle that has been responsible for inattention to the most potent means for restricting syphilis.

Osler says (Practice of Medicine, article Syphilis): "Personal purity is the prophylaxis which we, as physicians, are especially bound to advocate. Continence may be a hard condition (to some harder than to others), but it can be borne, and it is our duty to urge this lesson upon young and old who seek our advice in matters sexual. Certainly it is better, as St. Paul says, to marry than to burn; but if the former is not feasible, there are other altars than those of Venus upon which a young man may light fires. He may practice at least two of the five means by which, as the physician Rondibilis counseled Panurge, carnal concupiscence may be cooled and quelled—hard work of body or hard work of mind. Idleness is the mother of lechery; and a young man will find that absorption in any pursuit will do much to cool passions that, though natural and proper, can not in the exigencies of our civilization always obtain natural and proper gratification."

And Gowers says (Lettsomian Lectures on Syphilis and the Nervous System) regarding the prevention of syphilis: "One means alone remains, old as the malady itself, by which it can be prevented. One method, and one alone, is possible, is sure, and that one is open to all. It is the certain prevention secured by unbroken chastity. . . . The opinions that, on pseudo-psychological grounds, suggest or permit unchastity are absolutely false. Trace them to their ultimate basis, and they are groundless. They rest only on sensory illusions, one of the many illustrations of a maxim I have often to impress on various sufferers, 'There are no liars like our own sensations.' Rather, I should say, they rest on misinterpretations of these, always biased and often deliberate. With all the force that any knowledge I possess, and any authority I have, can give, I assert that no man ever yet was in the slightest degree or way the worse for continence or better for incontinence. From the latter all are worse morally; a clear majority are worse physically; and in no small number the result is, and ever will be, utter physical shipwreck on one of the many rocks, sharp, jagged-edged, which beset the way, or on one of the many banks of festering slime which no care can possibly avoid."

It has been thought that these quotations from two recognized authorities in medicine might do more to stimulate thought on this feature of the question than any personal remarks that might be regarded, as an easy means of dismissing the subject, or as *doctrinaire.*

The statistics that have been presented herewith do not show that syphilis is increasing, nor do they demonstrate that it is alarmingly prevalent or that it is very fatal. Regarding the latter point, it may be said that while the physician knows where syphilis begins, he can never absolutely tell, in any particular case, where it will end. The high mortality from infantile syphilis is hardly to be deplored, as it evidences Nature's weeding-out process, and there are other reasons besides those of euthanasia that make the survival of the unfit undesirable.

Each physician must fill the *rôle* of health-officer in his practice in treating these patients, and by carefully worded advice urge those infected to abstain from spreading the disease; urge them to pursue a systematic course of treatment, and use all his authority to prevent marriage for some years after acquiring the initial lesion.

The great care that is now exercised in selecting wet nurses, as well as the increasing prevalence of the custom of infant feeding where the mother can not nurse the child, reduces acquired syphilis from that source to a very small figure. While the general custom of vaccinating with animal lymph has made vaccinal syphilis more rare than ever. It is by increased hospital facilities and the personal influence of physicians that we must expect a decrease of syphilis in this country, where regulative measures applying to one sex only and to a pariah-class are not likely to become general.

From a sociological and economical standpoint it is believed that the facts herewith recorded show that the United States has little to fear from syphilis. It has been shown that in England, by the most liberal calculation, the number of persons annually affected with syphilis would not exceed two per thousand of population. But as this calculation was based upon the general national mortality from that disease, as well as the mortality in hospitals in which numbers of syphilitic patients were treated, it may be confidently asserted that it is an overestimate, and that the prevalence of syphilis in the United States is much less than two per thousand of population annually. While the average period of disability, including as it does that due to all forms of the disease, is twenty-eight days for each person affected, the average cost of treatment and the average loss of wages during that period may be estimated at one dollar and seventy-five cents per diem, or, in round numbers, fifty dollars for each individual acquiring syphilis. In the aggregate, even if annually but one person in each thousand of population was infected with syphilis, there would be with our present population a loss of more than three million dollars per annum on account of this disease.

When we are confronted with the heavy loss that syphilis causes from the standpoint of dollars and cents, that, like that of pounds, shillings, and pence with our English brethren, is of such potent influence in securing the enactment of sanitary reforms; and when we recall the disastrous influence that syphilis exercises upon the birth-rate as well as upon infant mortality, it may be asked whether we are justified in pursuing the *laissez-faire* procedures that have existed during the past. Conceding that syphilis is not increasing, and acknowledging the existing evidence that shows that it is not alarmingly prevalent, is it not sufficiently prevalent to urge us to make additional efforts to limit it besides those heretofore indicated? The first thought is, that the end desired may be attained by the regulation of prostitution, one-sided as such a measure may be. But it has already been shown that all legislation of this character has failed to accomplish the purposes for which it was enacted, and the numerous disadvantages associated with the system have been referred to by those familiar with its administration. Radical as the measures may be, no plan would be effective that did not embrace in its scope all the features included by Dr. M. E. da Cunha Bellem in the scheme presented to the International Medical Congress at London, that has been referred to in this paper. The omission of any one of the factors in that scheme would permit the introduction and spread of syphilis and invalidate the enforcement of the other factors, while the impossibility of applying these *in toto* is apparent to any one that will give them consideration.

It is on this account that, at variance with the impression that was entertained when the research for the preparation of this paper was commenced, it is not recommended that there should be regulation of prostitution by any plan that could be feasibly administered in this country. Rather than such a method as this latter, let all hospitals open their doors to the infected of both sexes, and thus endeavor to limit this preventable disease.

CHANCROID
AND ITS COMPLICATIONS.

EXPLANATION OF PLATE XXIV.

Fig. 1, chancroid in process of healing; suppurating bubo.

Fig. 2, gangrenous chancroid in negro; destruction of greater part of glans penis and of cavernous bodies.

Fig. 3, sloughing chancroid in mulatto.

PLATE XXIV.

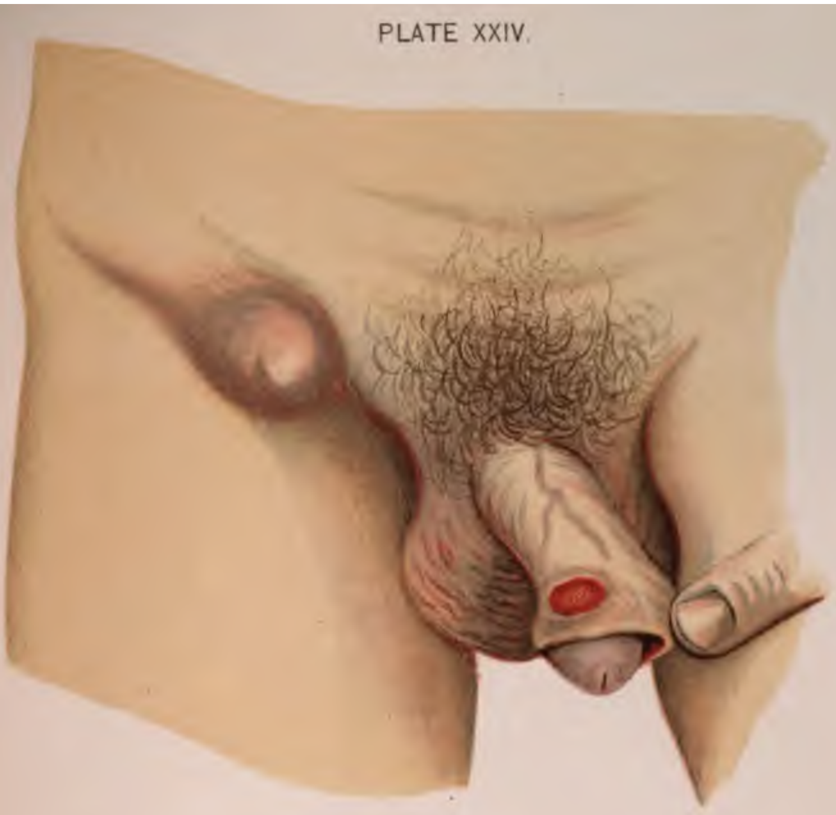

Fig. 1.

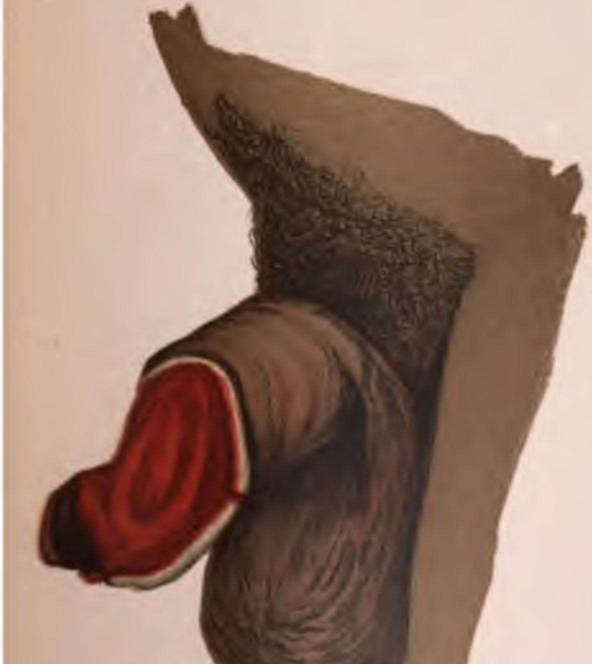

Fig. 2.

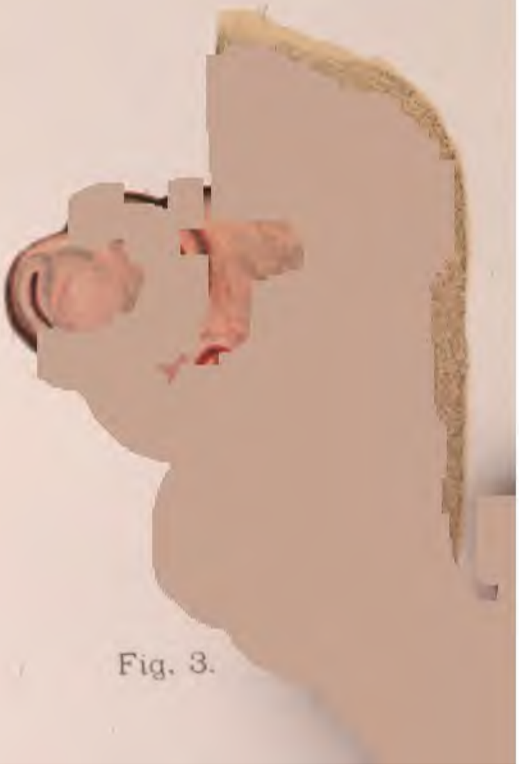

Fig. 3.

CHANCROID.

By EDWARD MARTIN, M. D.

Definition.—The chancroid has been variously named *soft chancre*, *simple chancre*, and *noninfecting sore*.

It is a contagious venereal ulcer, which when uncomplicated is not followed by constitutional symptoms. The term soft chancre is misleading, since these lesions are sometimes hard, and *per contra*, the syphilitic chancre, or true infecting sore, may be without induration.

Until the appearance of Bassereau's work (1852) the noninfecting and the infecting sores were alike classed as syphilitic, though it had long since been noted that certain of these sores were hard and were followed by constitutional symptoms; while others, soft as a rule and ulcerating freely, produced no effect on the system at large. Bassereau, basing his opinion upon a long series of confrontations, arrived at the following conclusion:

"No chancre which is followed by constitutional symptoms originates a purely local sore, nor does a local sore by contagion communicate an ulcer which is followed by syphilis."

This doctrine excited bitter opposition, but with some slight modification was generally accepted. The contest which raged upon this subject, and which has now little more than historic interest, has left its trace upon the writings of the day in the preservation of the terms *unity* and *duality* as applied to the venereal ulcer—the former indicating the old teaching as to the common nature of all these lesions, the latter representing the modern belief on this point.

Although chancre and chancroid essentially differ each from the other in etiology, course, and termination, the virus of each may be implanted upon the same spot at the same time. In such a case each virus produces its characteristic effect, but slightly modified by the presence of the other. The chancroid develops first, and may run its course to complete cicatrization before the indurated erosion of the primary lesion appears; or, the chancroid still persisting, induration may develop around it, to be shortly followed by typical inguinal enlargements. A developed chancre may become infected with the chancroidal virus, or the soft sore may be the entering point of the syphilitic poison. Such lesions—that is, those which are due to the action of both the chancroidal and syphilitic virus—are called *mixed sores*.

History.—Of the extreme antiquity of chancroid there can be but little doubt. Ulceration of the genitals has been described in the most ancient writings. There is, of course, no clear evidence that such ulcers were not due to causes other than chancroid, and it is possible they may have been syphilitic; but proof upon this point is wanting.

In the Ayurveda, the original of which is traced back by Hessler to more than one thousand years before Christ (Syphilis in Ancient and Prehistoric Times, F. Buret, p. 118), is found the following paragraph:

"Then, after excessive intercourse or a too great continence long after, one may have to do with a chaste woman who has not had sexual relations for a long time, and who has her courses, whose vulva may or may not be bathed in unhealthy secretion which becomes the seat of disease. If this man use excess with the woman, whether her vulva has or has not suddenly become a focus of corruption, the unhealthy humors engendered at the end of coitus may attack the penis, and whether the man be excoriated or not, they bring forth a pimple which is called the venereal disease."

Among the Greeks, Romans, and Hebrews there are frequent allusions to lesions which correspond with the chancroid. Celsus gives a description of both the soft and hard sores. Palladius (Hist. Lausiac, vit. 32) describes a libertine who caught from a lewd woman an inflammation of the glans, as the result of which the whole of the genitals mortified and dropped off. The patient ultimately recovered, and subsequently led an exemplary life. In the furious outbreak of syphilis at the end of the fifteenth century chancroids were frequently observed.

Etiology.—The dependence of chancroid upon micro-organisms is now universally conceded. This is shown by the highly contagious nature of the pus, which retains its virulent properties in spite of extensive dilution with water or any neutral agent, and by the fact that bactericides, such as acids or sublimate, or even moderate heat, render the discharge innocuous. Before the germ theory these peculiarities of chancroidal pus were clearly recognized, and were attributed to an irritating ferment engendered by lewdness and filth. Long before the acceptance of the germ theory, Donne (1835), quoted by Jullien (Maladies Vénériennes, 1879), attributed the lesion of chancroid to an organism which he called *vibrio lineola*.

To-day opinions vary as to whether chancroids are due to the action of ordinary pus micro-organisms or to special micro-organisms not yet identified. On the one hand, it is held that these sores differ from ulcers observed on other parts of the body only from the fact that the anatomical and physiological conditions about the sexual organs peculiarly favor the development of the ordinary pus microbes. As opposed to this view, it is maintained that these sores run a course essentially different from that characterizing a simple ulcer, and are in fact due to a specific micro-organism.

The principal arguments in favor of the chancroid being a simple ulcer caused by the inoculation of ordinary pyogenic microbes upon an abraded surface, are the following: The discharge of a chancroid can not be inoculated upon an unbroken skin surface. Examination of the discharge nearly always shows the presence of staphylococci or streptococci usually found in pus. Chancroids are most frequently encountered, and exhibit their most perfect development, in persons most exposed to the invasion of the pyogenic microbes—i. e., in filthy and cachectic individuals. Inoculation with the pus of acne or furuncle may produce sores not distinguishable from chancroid in appearance and in clinical course, and such sores may be repeatedly auto-inoculated. Moreover, different observers who have claimed the discovery of the pathogenic micro-organism have described different bacilli, and have, without exception, failed to offer the convincing proof afforded by inoculations of pure cultures grown on artificial media.

The arguments advanced in favor of the dependence of chancroid upon a specific virus are, however, not to be despised. In addition to the pyogenic micro-organisms which are found in every open wound, competent observers have described other bacteria which are associated with these lesions, and which appear as pure cultures in repeated auto-inoculations practised under antiseptic precautions. In the vast majority of cases chancroid arises from contact with the discharge of chancroid, and not from retained decomposing discharges. The chancroid runs its typical course in the persons of the most robust; often exhibiting no tendency toward self-limitation, and involving the anatomically associated lymphatic glands in degenerative processes with far greater frequency than is observed in simple suppurative processes. Auto-inoculation with the discharge of chancroid is more often successful, and can be repeated more frequently, than is the case with ordinary pus. Such inoculation, practised under modern antiseptic precautions, may be repeated many times with the discharge of chancroid, the ulcers after the second generation showing none of the pyogenic micro-organisms, but only those which are held to be specific to the lesion. Repeated inoculation of ordinary pus often fails, or, if successful, produces a slight and evanescent lesion. Such inoculation can not be indefinitely repeated under antiseptic precautions. A rapidly extending chancroid, if thoroughly cauterized, is at once converted into a simple ulcer; and though in the discharge of the latter pyogenic microbes abound, yet the lesion runs a benign and self-limited course, essentially different from that characteristic of the chancroid.

Claims for the discovery of the alleged specific microbe of chancroid are by no means of recent date. Didier and Salisbury (quoted by Bumstead, The Pathology and Treatment of Venereal Diseases, 1870) each described a different microbe, which was regarded as the specific cause of the lesion. Ferrari (Annales de Dermatol. et de Syphilig., 1885) states that the specific organism of chancroid is a bacillus a little smaller than the tubercle and lepra bacilli. These micro-organisms are readily colored with methyl blue, and are always found in the discharge of recent typical sores.

Luca (Gaz. degli Osped., 1886) is the first who claims to have discovered by modern methods of bacteriological research the specific micro-organism of soft chancre. He was able to cultivate diplococci and streptococci, which by inoculation produced typical chancroids. He stated that the bubo complicating chancroid differed in accordance with the form of infection. Simple bubo, he held, was due to the ordinary pyogenic bacteria, while the ulcerating bubo was the result of the direct action of the specific microbe, developing chancroidal inflammation only after opening, because the microbe is an aërobe (Cong. internat. de Dermatol. et de Syphiligraphie, Paris, 1889, Comptes Rendus).

Ducrey stated that the presence of streptococci and staphylococci in chancroidal sores is due to secondary infection. When antiseptic precautions were observed in auto-inoculation, these secondary incidental micro-organisms gradually disappeared from generation to generation, until finally none were found in the fifth or sixth transplantation. Inoculation on nutrient gelatin gave negative results, although implantation on the surface of the body caused typical soft sores. He concludes that the pure virus contains only one micro-organism, which is short and thick, with rounded ends, looking much like a figure of eight, and is found in the protoplasm and between the cells, often in chains and groups. It is colored by alcoholic solutions of fuchsin, methyl violet, and gentian violet. In the pus of buboes he never found any micro-organism, and he asserts that soft chancre always causes a simple bubo, the chancroidal variety occurring only as a result of infection after operation. He believes that the bubo is the result of the destructive action upon the glandular tissue of the chemical products engendered by the micro-organism of soft chancre.

Welander (Versuche einer Abortivbehandlung der Bubonen, Archiv für Dermatol. u. Syph., 1892) has found micro-organisms corresponding to those described by Ducrey, but not invariably, and always in very small numbers.

Krefting (Ueber die für Ulcus Molle specifische Mikrobe Erganzungshefte zur Archiv für Dermatol. u. Syph., 1892) conducted a series of elaborate investigations to test the truth of Ducrey's findings. In all, he examined twenty-three patients. Before inoculation the skin was washed with sublimate and ether, and usually the inoculated surface was covered in by a sterilized watch-crystal, which was held in place by means of cotton collodion and a gauze bandage. Through this transparent cover the development of the pustules could be watched. In most cases the inoculation pustules were continued to the seventh or eighth generation, in each case three points of inoculation being made. The contents of the pustules were examined microscopically two or three days after inoculation, before the crusts formed. The staining solution was as follows: Five-per-cent borax solution, sixteen grammes; saturated aqueous solution of methyl blue, twenty grammes; distilled water, twenty-four grammes.

Although other dyes show the micro-organisms, the solution of borax and methyl blue is preferable, since it does not overstain the protoplasm of the pus-cells, and thus renders easy the detection of the bacilli which usually lie in these cells. Culture experiments on artificial media invariably give negative results.

Cover-glass preparations were flamed in the customary way and were allowed to float in the dye for half an hour. After washing in distilled water, the preparations were dried and examined. The discharge from the ordinary ulcerating soft chancres was not examined microscopically, since here mixed infection is constant. In all the preparations examined as described above the bacilli were found, one and a half to two micromillimetres in length and half to one micromillimetre in breadth. These were short, thick, with rounded ends, and frequently appeared as though compressed in the middle, much resembling dumb-bells in shape. They were found in groups or singly in the protoplasm of the cells, or singly between the cells. In some pustules of the first and second generations other bacteria were observed. Streptococci and staphylococci were found only in the first generation. Whether the inoculations were practised with or without antiseptic precautions in two-day-old pustules, the same bacilli were constantly found almost always as pure cultures. In private patients the bacilli were very much more numerous in the second and third generation. This, Krefting attributes to their being treated while the chancroid is still recent and the virus still vigorous. In no instance was the author able to produce a pustule with inoculation of the discharge of a soft chancre without finding the bacillus already described. In pustules produced by inoculation of other materials—such, for instance, as the discharge of a syphilitic ulcer of the prepuce—only diplococci were observed. These pustules could be reinoculated, but caused no destruction of tissue, and dried up in about eight days. Another case of syphilitic ulcer inoculated showed almost every form of bacteria commonly found in pus.

Unna (Monatsheft für Praktisch-Dermatol., Bd. xiv, No. 12) states that he has demonstrated the micro-organism of chancroid in five successive cases, and that he is convinced that this is the specific bacillus, because it is found in all the typical sores which he excised, it is found in the tissues without the admixture of other micro-organisms; it is distributed in such a way as to most logically account for the histological and clinical symptoms characteristic of the chancroid; it is not found in simple ulcers nor in the initial sclerosis.

This bacillus is found in short or long chains lying in the lymphatic spaces, but not occupying the protoplasm of the leucocytes. It is a streptobacillus and, according to Unna, may be identical with the micro-organism described by Ducrey, though to the reader of Unna's article the only points of similarity would seem to be that each investigator has found a bacillus which can not be cultivated on artificial media.

Jullien (Annales de Dermatol. et de Syphilig., May, 1892), in the hope of verifying the findings of Ducrey and Krefting, as to the presence of a pathogenic microbe in chancroid, practised auto-inoculation upon two patients, both suffering from typical chancroids. The seat of inoculation was prepared in accordance with modern antiseptic principles, was thoroughly washed with soap and water, then successively bathed in solutions of microscidine, corrosive sublimate, carbolic acid, and finally in absolute alcohol; the point of inoculation was protected by means of a flamed watch-crystal, or by a sterilized cotton pad. The whole area was covered in by a sterile dressing. He was unable to carry these auto-inoculations in either case beyond the third generation.

Microscopic examination of the pus of the original chancroid showed microbes in great abundance and variety. The secretion of the inoculation pustules, however, showed absolutely no micro-organisms, although these secretions still retained some of their virulence. This shows, according to the author, quite conclusively, that the numberless micro-organisms observed in the secretions of the original chancroid have nothing whatever to do with the virulence of this lesion. He does not doubt that a specific micro-organism exists, but was absolutely unable to find the microbe described by Ducrey and Krefting.

Strauss obtained the same results as Jullien. He was unable to continue auto-inoculations beyond the fourth and fifth generations, although Ducrey and Krefting repeated these inoculations ten or fifteen times, and he never found the micro-organisms described by the latter authors.

A review of the bacteriological evidence as to the discovery of the specific micro-organism of chancroids leaves the question still *sub judice.* The bacillus found by Ducrey, the presence and the virulence of which was confirmed by the research of Krefting, although easily stained, and hence readily discovered, escaped the careful search of Jullien. Unna and Ferrari's description of the bacilli found by them are so vague that it is impossible to determine whether they tend to corroborate or disprove Ducrey's and Krefting's findings.

The fact that the discovery of the specific microbe can not yet be regarded as proved, by no means shows that the lesion is not due to such a microbe. The belief that syphilis is due to a pathogenic microbe is almost universal, yet the bacterium has eluded every method of modern research. Fournier says that when a chancroid is found there has been deposited pus from another chancroid under conditions favorable for its absorption. Keyes says that chancroid is always due to inoculation of pus derived from a similar ulcer. No amount of sexual excess, no degree of ulceration, no traumatic or chemical irritation, however prolonged, no simple or poisonous ulceration from other specific source (syphilis, cancer, glanders, etc.), nothing, in short, can produce chancroid except chancroid.

As opposed to this view Taylor thinks it is generally accepted that the chancroidal pus contains the staphylococcus, pogenes, aureus, and albus, perhaps the streptococcus, and that it is not dependent upon a specific microbe. Finger (der Syph. u. der Venerischenkrankheiten, 1888, p. 181) says that the generally accepted theory of the day upon this subject is, that the soft chancre is simply due to inoculation with pus, since pus, under favorable circumstances, is able to produce in all persons inoculable sores.

The whole question as to the dependence of chancroids upon pus microbes or upon a specific microbe is still an open one. The corroboration or disproval of the findings of Unna and of Ducrey and Krefting is comparatively easy, but even this will not leave the matter more definitely settled than before. I believe that ultimately the specific microbe will be found.

Inoculability of Chancroid.—It seems to have been fairly well shown that the virulent properties of the chancroidal discharge are found in the pus-cells, since inoculation with the discharge from which pus-corpuscles have been filtered out is not followed by the development of the typical sore. It also seems well proved that chancroid is capable of inoculation indefinitely repeated. Some experimenters have reinoculated themselves thousands of times, each inoculation being followed by a positive result. Syphilization—a practice founded upon an imperfect knowledge of the distinction between chancroid and chancre, and now happily only of historical interest—has shown that after a certain time the skin acquires immunity against chancroidal inoculation, and also that different parts of the body show varying susceptibilities to the action of the pus. The immunity is, however, only temporary, one attack of chancroid protecting not in the slightest degree against another. Although it is true, as a general rule, that during the entire existence of the chancroid, implantation of its discharge upon erosions or excoriations of the skin or mucous membrane will produce chancroids, in proportion as the original sore grows older the virulence of its discharge grows less. At the period of healthy granulations, when the sloughing process has ceased, this virulence practically may be said to cease. The inoculations practised at later periods produce pustules and ulcerations which are less and less typical. Successive inoculations have a tendency to become milder, so that as a rule it may be said that the original pus of each chancroid is capable of auto-inoculation, which can be repeated only a limited number of times.

The result of inoculation varies not only with the age of the chancre, but also depends upon the position selected for auto-inoculation. Thus, when these inoculations are made upon the thigh, large sloughing ulcers not infrequently result. The same pus inoculated upon the belly produces much more manageable lesions; while if the chest, arms, or face are selected, the lesions are still less serious.

Finger and others teach that many acute diseases, such as pneumonia, pleurisy, and eruptive fevers, during their course render the patient immune to inoculation with the chancroidal virus. This is disputed by Keyes, who states that such diseases do not furnish immunity.

Frequency of Chancroids.—Of the three venereal diseases, syphilis, gonorrhoea and chancroid, the latter is by all odds the least frequent, though if cases of primary lesion alone are considered, chancroid is, according to statistics, more common than chancre.

Comparative tables designed to prove the relative frequency of chancroid and chancre show, according to Sturgis's collection (International Encyclopædia of Surgery, vol. ii, p 334) of a total 13,572 cases, that 10,337 were suffering from chancroid and 3,235 from chancre.

The records of my own service show that the local sore—that is, chancroid—was less frequent than chancre. Last year, in the Venereal Dispensary of the University of Pennsylvania, 591 purely venereal diseases were treated. Three hundred and forty of these suffered from gonorrhœa, 110 from syphilis, and 95 from chancroid. The only authors agreeing with this statement in the tables quoted by Sturgis are Belhomme and Martin.

Although the hospital records generally show that chancroid is more frequent than chancre, and hence, given a patient with sores about the genitalia, the odds are in favor of the sore being chancroidal, such a deduction can not be drawn in private practice where the chancre is encountered quite as frequently, as the soft sore, if not more so. The reasons for this are sufficiently clear, and have been especially dwelt on by Fournier. The patients who apply to the hospitals for help are usually the poor, ignorant, and uncleanly, those given to excesses and accustomed to consort with the lowest and most depraved women of the town. Such patients are careless of themselves, and indifferent as to the condition of the partners of their pleasures.

In my venereal service two thirds of the ninety-five chancroids observed in the last year came from one block in Philadelphia. Nearly every house in this block is filled with dirty, drunken women, who earn their living from the passing strangers. The houses are placed near the river front, and are particularly popular with sailors. The majority of these women whom I examined were old syphilitics, hence immune to the attacks of this disease and free from contagious specific lesions. They, like their partners, customarily exhibited chancroids. Many of the young women were, however, suffering from chancres and secondaries; hence syphilis originated more frequently from this focus than from all the other parts of the city combined.

The well-to-do, those who consult the surgeon in his office, are protected from chancroid by their cleanliness and general healthy condition; by the fact that they would probably detect a lesion as gross and superficial as that characteristic of the chancroid; and also because the women with whom they consort promptly seek medical relief for any external inflammatory disorder from which they suffer. Even in dispensary practice, however, syphilis in one or another of its phases is much more frequent than chancroid. The chancre relatively is less frequently met with, because it causes such slight inconvenience that the ignorant unwashed either do not see it at all, or do not consider it necessary to seek medical advice for such a trivial lesion.

The chancroid is usually multiple. In Sturgis's collection of 950 cases, 265 were single, and 685 were multiple. Of 502 cases of chancre, 386 were single and 116 multiple.

Location of Chancroid.—The chancroid may be placed upon any portion of the skin or orificial mucous membranes.

Its usual location is on the genitalia, and it is not infrequently observed in and around the anus, about the buttocks and on the thighs. Cases have been reported where the sores attacked the mucous membrane of the mouth, the nose, the conjunctiva, the scalp, the fingers, and the urethra.

According to Sturgis, the extra-genital chancroid occurs in about the same percentage of cases as does the extra-genital chancre. His statistical study does not seem to prove this statement, nor is it in accordance with the experience of the genito-urinary surgeon, to whom, if the peri-genital region be excepted, extra-genital chancroid is a lesion of great rarity. The genital chancroids in the male are usually found upon the glans and prepuce. The favorite position is at or near the frænum. This is because this region is particularly exposed to abrasion during sexual congress, and the sulci at its sides are difficult to cleanse.

Of one hundred and sixty-two cases observed in the University Hospital Venereal Department, thirty-seven involved the frænum, thirty-four the præputial mucous membrane, and thirteen the dermal layer of the prepuce; twenty the glans, fifteen the sheath, two the peno-scrotal junction. There were no cases of extra-genital chancroid, and but one instance of chancroid of the meatus. Of the twelve hundred and seventy-one cases of chancroid in the male collected by Sturgis, the very large majority were observed upon the glans penis, the prepuce, the fossa glandis, and the sheath of the penis; twenty-four were of the meatus urinarius, nine were of the urethra, nine upon the scrotum, and thirteen were extra-genital. Of these, three were about the anus, three were on the finger, five on the anterior thoracic region, and one on the nates.

Finger states that the points of predilection for the invasion of the chancroid are in males the coronary sulcus, the urethral orifice, the margin of the prepuce; in females, the margins of the greater and smaller labia. This statement is not borne out by my own observations. Chancroid of the urinary meatus is less common than chancre of this region, and involvement of the præputial margin in the chancroidal ulceration is not so frequent as development of the sores at or near the frænum. Urethral chancroid is usually due to extension of the lesion backward from the meatus. Sores very rarely develop primarily back of the meatus. In such a case the symptoms would closely resemble those of gonorrhœa.

In women the fourchette and the inner surface of the labia majora and minora are particularly prone to exhibit chancroidal lesions. The sores have also been observed at the urinary meatus, on the surface of the vagina, and on the cervix uteri. In women, anal chancroid is far more frequent than in men; this not because of unnatural practices, but rather because contaminating discharges flow backward from the vagina, invading cracks or fissures which may be present about the rectal opening.

The *extra-genital chancroids* are by no means rare. Those upon the fingers and hands are occasionally observed, but very few cases of cephalic chancroid have been described.

Taylor narrates the case of an Irishman with an exceptionally long prepuce, phimotic, suffering from multiple marginal chancroids. These sores were about two weeks old. A subpræputial injection of dilute carbolic acid was given. Five days later there was observed directly over the outer margin of the left supraorbital arch, a thick, greenish-brown crust a half inch by one and a half inch in extent; around this were placed a number of smaller crusts. There was a marked inflammatory aureola, but no purulent discharge. The left eye was entirely closed, from œdema of the upper lid. The patient stated that he received a cut in this region incident to a fall. After two days this wound received practically no dressing. He then suffered from pain and swelling. On removal of the crusts two chancroids were exposed, one running a rapid destructive course. Successful auto-inoculations were practised. The entire wound was cauterized with fuming nitric acid, and healing promptly followed.

Puche narrates a case, which Ricord freely accepted, in a man twenty-eight years of age, who presented himself suffering from a circular ulcer on the inner surface of the lower lip. This presented all the appearance of chancroid, and lasted for three or four days, having appeared eight days after unnatural sexual relations. Auto-inoculation was successful in this case.

The existence of chancroid upon the head or in the buccal cavity was at one time doubted, but this has been abundantly proved both by clinical observation and experimental inoculation. As a practical point, however, it should be borne in mind that the simple venereal sore is in these regions so rare as to constitute almost a surgical curiosity. Fournier's collection of one hundred and fifty-eight cases of cephalic sore fails to show a single undoubted instance of chancroid.

Varieties of Chancroid.—When the chancroidal virus obtains entrance through a follicle, the lesion first formed very much resembles an ordinary furuncle. There is a hard, dusky-red, elevated, painful papule, which shortly ulcerates and is converted into a typical round, punched-out ulcer. This is called a *follicular chancroid*, and is always attended, at least in the beginning, with marked peripheral infiltration.

If at the time of contagion there is an erosion, or loss of continuity of the surface from any cause, the whole eroded surface usually becomes chancroidal and the shape of the ulcer is very irregular, dependent upon the original outlines of the erosion. Such lesions, especially if large, are usually more superficial than the follicular chancroids. The surface of the ulcer is irregular and worm-eaten, and is covered with a grayish, diphtheroid pseudo-membrane formed of necrotic tissues infiltrated with pus. Peripherally there is an inflammatory areola; it is not indurated to the extent noted in syphilis.

In patients who are watchful of their symptoms the first manifestations of local trouble may appear in the form of a vesicle which is termed the *herpetiform chancroid*, and in reality is the earliest stage of the sore, before there has been sufficient time for the vesicle formed at the site of inoculation to become converted into a pustule or an ulcer.

When the chancroid is characterized by the formation of crusts due to drying of the secretion, it is termed *ecthymatous*.

A chancroid characterized by marked inflammatory induration is termed *ulcus elevatum*. The induration may at times simulates so closely chancre that diagnosis from examination of the sore alone is almost impossible.

When from irritation, or because of impaired tissue resistance, the inflammatory symptoms become intensely marked the lesion is termed *inflamed chancroid.* If this inflammation runs on to marked extension and tissue destruction, the lesion is termed *phagedenic.* Where the tissue destruction is extensive, the chancroid is termed *gangrenous.* When the lesion becomes chronic, involving a large surface and extending in one part while cicatrization is taking place in another, it is termed *serpiginous.*

Pathology. — Microscopic examination of the chancroid shows a marked small cell infiltration undergoing granular degeneration. This forms the foundation of the ulcer. It involves the corium, and is somewhat sharply limited in depth, but laterally it extends considerably beyond the ulcer, invading the papillæ still covered with epithelium. The papillæ which closely surround the ulcer are club-shaped, elongated, and widened. The inflammatory infiltrate exhibits a reticulum in the meshes of which numerous embryonal and epithelioid cells are held. It occupies the adventitia of the blood-vessels, which are dilated and are increased in number. Lymph-vessels are also very numerous. Injections of the lymphatics practiced after circumcision, necessitated by a phimosis dependent upon chancroid, show that this system forms a close network in the infiltrate and extends even to the ulcer, some of these vessels opening directly at this point, so that if by means of a hypodermic syringe an injection is thrown into the healthy tissues two fifths of an inch from the border of a chancroid, without employing the least pressure, the injection material will flow from the surface of the sore very much as would be the case if a similar injection were made in the substance of a sponge (Letzel, Finger).

The Clinical Features of Chancroid.—The development of a chancroid from the time of its inoculation to the formation of the typical sore has been thoroughly studied, since the capability of inoculating the virus and the popularity of this procedure have given many competent observers abundant opportunity to study the question.

Such inoculation is now used only for diagnostic purposes. When the discharge is inoculated upon the same person from whom it is taken, it is called auto-inoculation ; when it is practised upon another person, it is called hetero-inoculation.

The inoculation chancroid is generally placed on the sides of the chest below the nipple line, since here experience has shown that the resulting sore is manageable, and that there is slight danger of producing destructive lymphadenitis. In making these inoculations the selected area should be cleansed by means of repeated washings, first with soap and water, then with ether, and finally with boiled sterilized water. The surface is dried by means of sterilized cotton and is inoculated. Inoculation is accomplished by moistening the point of a scalpel in the discharge of a chancroid, passing this point perpendicularly down to the true skin, rotating the knife on its long axis, and rubbing in as much of the discharge as remains on the sides of the blade. A watch-crystal is then placed over the site of inoculation, undue pressure from its edge being prevented by a little absorbent cotton; this dressing is secured in place by means of rubber adhesive straps. Thus the observer is enabled to watch without difficulty the course of the inoculation.

In from one to four days an inflamed pustule develops. On removing the epidermal covering of this, there is exposed a ragged, punched-out, undermined ulcer presenting a greenish or gray irregular floor circular in outline and penetrating nearly if not entirely through the thickness of the skin. This ulcer extends with more or less rapidity for several weeks, then remains stationary for a time, finally undergoes involution, ultimately healing and leaving a cicatrix. In case the epiderm covering the original pustule is not removed, there is a tendency to form thick crusts, beneath which the ulcer steadily extends. From the result of inoculation Bumstead concludes that—

1. The chancroid has no period of incubation; that the pathological process is set up the moment that the virus is introduced beneath the epidermis.

2. That the chancroid first appears as a pustule, but that it ordinarily consists in an ulcer underlying the elevated epidermis and presenting the characteristics above stated.

3. That the chancroid is capable of healing spontaneously without the intervention of art.

The inoculation chancroid may be said to present the sore in its typical form. The history of chancroids acquired in the ordinary way—that is, by sexual contact—differs in some points from that of the inoculation sores. This, however, is mainly dependent upon the fact that such sores are not subjected to accurate scientific observation. Thus, while the inoculation chancroid has no period of incubation, careful examination as to the time elapsing between exposure to contagion and the development of the ulcer in clinical practice would show a distinct period of incubation in a certain proportion of cases.

This is usually because the beginnings of the sore are not noticed. The pustule is superficial, and the patient is not aware of the existence of the lesion until the ulceration is fairly extensive. Indeed, I have exposed upon the surface of the glans a typical chancroid the size of the little finger nail, and one which was certainly seven to nine days old, the presence of which was a revelation to the patient.

Fournier found that in the great majority of his cases, even following the statements of the patient, the period elapsing between exposure and detection of the sore was not greater than one week. In some few cases the lesion did not appear for two weeks, or even three weeks, after exposure. In my hospital records the average incubation was one week. In a few cases I have seen in private practice the average incubation was less than three days, this tending to show that there is in reality no period of incubation, failure to detect the lesion depending upon carelessness on the part of the patient. Ricord explains the cause of late contagion upon the ground that the virus is deposited upon healthy surfaces, these later become eroded, allowing the virus to obtain entrance and to produce its characteristic effects.

The pustule with which the chancroid begins is rarely observed, the lesion first appearing as an ulcer, which is either crusted or open and is freely secreting. This lesion is usually rounded in shape, though when a hair-cut or an abrasion has been inoculated, or when it attacks the folds of the anal mucous membrane, its outline may be very irregular. It is frequently undermined, with a worm-eaten surface, of a yellowish-gray color, and is surrounded by an inflammatory areola.

The chancroid if untreated extends in depth and circumference for about four to six weeks. At the expiration of this time granulations become healthy, and in one or two weeks the lesion cicatrizes.

Diagnosis.—The characteristics upon which a diagnosis of chancroid is founded are—

1. Absence of a distinct period of incubation.
2. The location, development, appearance, and number of the lesions.
3. Auto-inoculation.
4. Absence of an indurated base.

It has already been shown that chancroid may not develop for many days after exposure. This, however, is most exceptional, the lesion usually appearing within a few hours, or at most a few days.

It is unfortunately the rule that, even though the patient be accurate and unreserved in his statements, not much help is given by the history of the case, since there have been frequent exposures at varying intervals before the appearance of a sore. A clear history of incubation of less than twelve days, when obtainable, suggests very strongly the chancroidal nature of a sore.

Lesions located elsewhere than on or about the genitalia or in the region of the anus are probably not chancroidal, though a few recorded cases, and particularly the history of inoculation, show that the virus may cause its characteristic lesions on any cutaneous or mucous surface.

The development of the lesion is characteristic. There is first a vesicle, which in twenty-four hours becomes converted to a pustule, discharges, and exposes a rounded, ragged, punched-out ulcer. When an abrasion is infected this becomes inflamed, suppurates, and forms an unhealthy ulcer, corresponding in shape to the original lesion.

The appearance of the lesion is usually the most reliable diagnostic feature. The punched-out, round, irregular, or ragged, often undermined ulcer, which spreads rapidly, secretes freely, is frankly inflammatory in type, and exhibits an unhealthy diphtheroid, worm-eaten surface, can scarcely be confounded with any other lesion. It is rather the atypical sores which may cause confusion. Thus the chronic chancroid which forms at times upon the external genitalia of women may readily be mistaken for a chancre, since it is indurated, shows no symptoms of acute inflammation, and heals very slowly. Not infrequently, either through the resistance of the tissues inoculated or weakness of the virus implanted, the chancroid remains purely superficial, approaching in type a simple erosion or the lesion of herpes rather than that of a deep and extending ulceration.

The fact that lesions are multiple, one sore developing after another, particularly on healthy surfaces opposed to the original lesion—as, for instance, upon the skin of the scrotum at a point touched by a chancroid of the frænum—is characteristic of chancroid, though any focus of suppuration may produce inflammatory reaction by inoculation. Chancre may be multiple, but in such cases inoculation at all the involved points took place at the same time, and the development of the lesions is synchronous, or very nearly so. Inoculation of a surface touched by a chancre rarely takes place, and when observed the resultant sore does not resemble the original lesion, being due to implantation of the ordinary pus microbes.

Auto-inoculation is by no means an infallible test, since when practised under modern antiseptic precautions it has repeatedly failed to produce a sore more typical than that resulting from the discharges incident to ulcerating venereal warts or other non chancroidal lesions. If the commonly accepted doctrine as to the dependence of chancroidal lesion upon the ordinary pyogenic micro-organism be accepted, auto-inoculation as a means of determining whether a lesion is syphilitic or chancroidal in nature is practically worthless, since the suppuration from a true chancre, though slight, is due to the same cause as that from a chancroid; hence, with some modifications possibly dependent on the virility of the micro-organisms and the vitality of the patient, inoculation from a chancre or a chancroid might be followed by the development of the acute ulceration heretofore deemed characteristic of chancroidal virus. Occasionally the inoculation chancres attain greater dimensions and are more rebellious to treatment than are the original lesions for the diagnosis of which inoculation was practiced.

The absence of induration is also a sign upon which too much dependence can not be placed. When local inflammatory phenomena are markedly acute in type there is developed an inflammatory induration so like that attendant upon certain forms of chancre that distinction between the lesions on this point alone is a matter of very great difficulty, or is even quite impossible. This induration, it is true, is not sharply circumscribed, is generally attended with œdema, and on firm, continued pressure the general shape of the infiltrate can be altered, differing in all these respects from the induration of chancre. The absence of infiltrate by no means proves that a given lesion is chancroidal. Thus certain chancres are not infiltrated, and herpes, the lesions of balano-posthitis, and simple abrasions are habitually free from peripheral hardening.

The most important practical consideration in the examination of chancroid is to distinguish it from true chancre. The salient features of each lesion on the recognition of which a differential diagnosis is founded have already been fully considered in another part of this work, but it is not amiss here to recall the fact that we have absolutely no reliable sign or symptom upon the basis of which such a differential diagnosis can be made with certainty. If a specific micro-organism of either syphilis or chancroid were identified, the differential diagnosis would be as readily made as, for instance, is that between simple and gonorrhœal urethritis. As it is, a differential diagnosis must be based upon the presence or absence of several elements of the symptom group characteristic of the syphilitic or chancroidal sore. Of all means of diagnosis, the most reliable is probably confrontation and a clear history as to the interval elapsing between exposure and the development of lesions. Even the inguinal lymphadenitis may fail as a means of diagnosis. In chancroid, two or even three glands of one side may increase to three or four times their normal size, become almost cartilaginous in density, and slowly subside without suppurating, while suppurating inguinal lymphadenitis in cases of chancre is by no means rare. Scrapings from the two lesions sometimes throw light on the diagnosis, those from the chancre containing epithelium, those from the chancroid exhibiting granulation tissue. But in case of a deep chancre and of superficial chancroid this may be exactly reversed.

The *mixed chancre*—that is, a lesion resulting from inoculation with the chancroidal virus and that of syphilis at the same point—exhibits the characteristics of both sores. If both inoculations take place at the same time, the chancroid will have run its course to the healing stage before the induration and adenitis characteristic of syphilis develop. A well-developed chancre is, however, not exempt from chancroidal inoculation, nor is it impossible for the micro-organism of syphilis to obtain entrance into the system through the breach of continuity incident to chancroid.

In such cases a differential diagnosis can scarcely be made.

It follows that, even though a perfectly typical sore is encountered, it is not safe to assert positively that syphilitic infection has not taken place.

Herpes, follicular abscess, balanitis and balano-posthitis, abrasions or hair-cuts, are scarcely to be differentiated from chancroids at the time beginning inflammation first attracts the patient's attention to them. In one or two days, however, the superficial nature of the lesions and the prompt yielding to treatment show the absence of chancroidal poisoning.

An ulcerating papular syphilide attacking the genitalia may closely simulate chancroid; but here the history of the case, the appearance of the lesion, which is not punched out, and particularly the presence of the eruption on other surfaces of the body, would show the true nature of the local lesion.

Ulcerating gummata of the genitalia may exactly simulate chancroid in appearance. The history of an induration preceding ulceration, the slow progress of the case, and the absence of acute inflammatory symptoms and of glandular involvement, would suggest the syphilitic nature of the affection.

The tuberculous ulcerations of the penis are most difficult to diagnose from chancroid. The slow progress of the case, the identification of miliary tubercles about the periphery of the lesion, the detection of tubercle bacilli in scrapings, and the presence of tuberculous lesions in other parts of the body, will lead to a correct diagnosis.

The *extra-genital chancroids* are rarely recognized as such. No doubt they are more frequent than the number of reported cases would suggest. This is probably because they are not referred to venereal specialists for treatment, but are under the care of the general practitioner, who confounds them with other lesions. Their development and clinical history is not materially different from that of the genital chancroid.

THE COMPLICATIONS OF CHANCROID.

The complications of chancroid are:

1. Lymphangitis and lymphadenitis (bubo).
2. Phimosis and paraphimosis.
3. Excessive inflammation, sloughing, and gangrene.

Lymphangitis, or inflammation of the lymphatic vessels, is a rare complication of chancroid. In the great majority of patients suffering from chancroidal buboes the lymphatic vessels which carry the irritating products from the ulcer to the involved gland are not appreciably affected.

When these vessels are involved, there can usually be felt one or more tender, indurated cords passing along the dorsum of the penis. The inflammation involves the perivascular tissues, so that they become infiltrated and œdematous, the overlying skin is usually reddened and adherent to the band of inflammatory exudate below, and knots may form in the course of the lymphatic vessels, which are prone to suppurate and ulcerate, sometimes being converted into true chancroids.

Bubo, or Lymphadenitis.—Bubo is by far the most frequent complication of chancroid. Sturgis states that it occurs in about thirty per cent of cases. Letzel says that about ten per cent of chancroidal cases suffer from this complication. The records of my venereal service show that of one hundred and sixty-two cases of chancroid, bubo occurred in thirty-one, or a little over nineteen per cent. Of these thirty-one cases of bubo, sixteen occurred as a complication of chancroid of the frænum. Thirty-four cases of chancroid of the reflected layer of the prepuce were complicated by bubo in four instances. Chancroids placed on other surfaces of the genitalia were followed by buboes very exceptionally. This by no means represents the percentage of buboes which will be encountered in private practice. The cases which apply to hospitals for relief, and on which statistics are founded, represent the class who from neglect, exposure, and malnutrition are particularly prone to involvement of the glands. Among the well-to-do, who are cleanly, observant of directions given, and who apply for treatment early, bubo will not occur in five per cent of all cases.

Etiology.—The etiology of bubo is not entirely clear. It by no means depends upon the extent or clinical features of a chancroid. Those sores which are most destructive are not necessarily attended with inflammation of the lymphatic glands. Indeed, it is possible for sloughing of the entire penis to take place with little or no involvement in the direction of the lymphatics. On the contrary, the most insignificant lesions may be accompanied by multiple suppurating buboes, and, indeed, the latter may develop after the chancroid has been completely cicatrized.

Usually one or more glands of the affected side are involved. Sometimes the involvement is upon the side opposite to that of the lesion, and not infrequently tumors are found in both groins. This is particularly the case when the lesion involves the frænum; and, indeed, chancroid in this location is more frequently complicated by bubo than is the case when it involves any other surface of the body. Buboes are particularly liable to complicate chancroids when the latter are not carefully treated from the beginning. Constant bodily activity, especially that which tends to irritate the chancroid, or lack of cleanliness, or retention of discharge, such as occurs when the lesion is allowed to scab over, or when it attacks the glans penis or the inner surface of the foreskin in the case of a phimotic, irritation of the lesion by applications not sufficiently strong to cause total destruction of the diseased parts yet sufficiently powerful to occasion inflammatory reaction, are strong predisposing factors in the development of bubo. *Per contra*, cleanliness, quiet, careful, repeated antiseptic dressings, prompt removal of discharge, will render the occurrence of lymphadenitis a rare exception.

Bubo may develop at any time during the course of a chancroid, or some weeks after its complete cicatrization. It is usually located in the glands which receive lymph from the genitalia, since it is on the latter that lesions are usually found. The glands commonly involved are the superficial inguinal glands found below Poupart's ligament. Involvement of the glands lying below the saphenous opening and those lying in the pubic region is rare.

The theory is commonly accepted that buboes are due to micro-organisms, which are readily carried into the lymphatic system, owing to the fact that the terminal vessels open directly upon the ulcerating surface of the chancroid. These micro-organisms are supposed to be carried through the vessels and to produce no marked effect until they reach the gland, where by multiplication and irritant action on the tissues they produce either a hyperplastic inflammation or suppuration. Buboes have been classified as *simple* or *chancroidal*, dependent upon the presence in them of the micro-organisms of suppuration or of the specific virus of chancroid. The *simple bubo* either undergoes resolution, or, if it suppurates and is opened, heals as would a suppurative adenitis due to an ordinary infected wound. The *chancroidal bubo* causes extensive destruction of tissue, and on being opened forms a sore offering all the clinical features of the chancroid from which it was inoculated.

Bacteriological research does not, however, justify the belief just given as to the etiology of buboes or their classification into simple and chancroidal. Repeated microscopic examinations of the contents of suppurating buboes have absolutely failed to show the presence of any micro-organisms, and auto-inoculations practiced with this discharge have not produced characteristic lesions. Thus Strauss demonstrated in two cases that inoculations with the pus of buboes were followed by no results, although control experiments with secretions of the soft chancre were successful. In no case where the bubo was treated antiseptically after opening did it take on a chancrous form after ulceration. He held that the bubo primarily was never virulent, but only became so by secondary infection after operation.

It is true, both Krefting and Horteloup state that they have practised inoculation from the discharge of buboes with positive results. One of the cases on which Krefting bases his opinion—namely, that the bubo may sometimes contain the specific virus of chancroid—presented himself with a suppurating, discharging bubo of the left groin, and a fluctuating tumor of the right groin the size of a walnut. The patient had been exposed to contagion two months before, and in four days developed two ulcers in the coronary sulcus. The open bubo had developed three weeks before the patient was seen, and had discharged for two weeks. The bubo in the right groin began to develop two weeks before the patient presented himself. The discharging bubo had not been opened till two weeks after the chancroids were completely cicatrized. Twelve inoculations made from the pus taken from the bubo in the right groin gave negative results, and microscopic examination of the contents of this bubo failed to show micro-organisms. Inoculations from the opened bubo of the left groin gave positive results.

Krefting holds that in this case the bubo could not have been inoculated secondarily, since the original chancroid was healed three weeks before the bubo was opened.

In another case presenting a characteristic chancroid on the outer surface of the prepuce, a red, tender, nonfluctuating bubo the size of a walnut was found in the right groin. Inoculation with the secretion of the chancroid gave positive results. The chancroid was excised and the resulting wound was closed by suture, and the bubo was protected by a sterilized cotton dressing which was held in place by a bandage; eleven days later the bubo opened spontaneously. Inoculation practised with the discharge from the bubo caused typical ulcers, and microscopical examination showed that the specific micro-organisms were abundant.

Observations upon another case seemed to show that not only is the pus of nonvirulent buboes free from micro-organisms, but contains elements which absolutely inhibit the growth of these.

A patient presented himself with a large fluctuating bubo the size of a hen's egg, in the left groin, and a single, deep chancroid on the inner surface of the prepuce. Three inoculations were made from the chancroid upon the belly. These inoculations produced typical lesions. By means of a syringe the pus was then withdrawn from the bubo and was mingled with the virulent discharge of the chancroid. Inoculations made with this mixed pus failed to take. In the light of Boeck's research, which has shown that the discharge of a chancroid can be diluted with several hundred parts of a bland fluid and yet produce characteristic lesion, the results of this experiment are exceedingly interesting.

The evidence leads strongly to the belief that bubo is due not to the direct action of micro-organisms upon the lymphatic glands, but rather to the absorption of certain chemical substances produced by the micro-organism's action in the chancroid. These products on reaching the lymphatic gland produce inflammation and extensive destruction of tissue without the direct intervention of any micro-organisms, so that if the fluid contents of such buboes be withdrawn under antiseptic precautions it will be found free from micro-organisms, and on inoculation will not produce a chancroidal lesion. After the bubo has been opened, and especially if antiseptic precautions have not been taken, it is often inoculated with the chancroidal pus, and the whole exposed surface may become converted into a huge chancroid. This is, however, rare; perhaps, as has been suggested by Krefting, because the discharge from these buboes contains elements which directly inhibit the growth of the chancroidal virus.

The evidence is strong, but not conclusive, that in certain exceptional cases not only the irritating products of the micro-organisms, but even these micro-organisms themselves, are carried directly to the lymphatic glands.

Pathologically the lymphadenitis begins as an active inflammatory exudate in the substance of the gland. This exudate is prone to suppurate, and involve the gland capsule, which becomes eroded and finally perforated, allowing the pus to escape into the periglandular tissue, which in the meantime exhibits the symptoms of acute inflammation.

Symptoms.—Bubo usually begins with sensations of pain in the inguinal region, excited by walking or any motion of the leg. On examination, the patient finds one or more tender, hard, movable lumps. The tumors steadily become larger, at the same time the pain on motion becomes so severe that walking is almost impossible. As the tumors increase in size they become less movable, less distinctly outlined, and finally the overlying skin becomes œdematous, reddened, adherent, and on examination distinct fluctuation is perceived. Sometimes the intense pain is rather suddenly relieved, at the same time the tumor becomes somewhat more diffuse. This is due to rupture of the capsule of the gland and escape of its contents into the periglandular tissue. When several lymph glands are involved and suppuration takes place, the individual tumors become merged into one large abscess. When this abscess opens spontaneously, or is incised, there is evacuated a thick, blood-stained purulent fluid, leaving a cavity which presents gray, necrotic walls, and often has projecting into it several of the neighboring glands which have not yet been completely destroyed. If the abscess is allowed to open itself it often produces extensive destruction beneath the skin before spontaneous evacuation, burrowing in all directions, and forming sinuses which are subsequently most difficult to heal. In certain cases, a few days after opening, such an abscess is converted into a large ulcer.

After evacuation of the contents of a suppurating bubo, and especially if drainage is provided for, either by free incision or by careful packing, healthy granulations shortly appear in place of the gray, sloughing surfaces, and the lesion heals without complication. Exceptionally these granulations become exuberant and form fungous masses projecting from the opening.

When the lesion is attacked by chancroidal ulceration, vigorous treatment is usually successful in converting the lesion to a simple ulceration, after which healing takes place promptly. The ulcerating buboes not infrequently, however, reach enormous dimensions before they can be checked. Thus they may expose the vessels and nerves, and even occasion fatal bleeding by ulcerating through the walls of large arteries. Sometimes these huge chancroids, in place of becoming limited and healthy, take on a chronic form of ulceration, which may last for months or years, slowly extending and involving a large surface.

In cases predisposed to glandular disease, as, for instance, those of the tuberculous temperament, the whole chain of inguinal glands may be involved, forming a nodular tumor which slowly enlarges till it reaches an enormous size, often as large as a child's head. These glands suppurate, usually one after the other. The process is extremely chronic, and, unless treated by the extirpation of the entire diseased mass, may last for months or years, producing fistulæ which yield only to the knife.

In women buboes are comparatively rare. If they occur they are usually found in the inguinal region, and pursue the same clinical course as in men.

Diagnosis.—The chancroidal bubo does not differ from that incident to gonorrhœa, or to infected wound of the leg or foot. In the latter instance, however, the gland lying beneath the saphenous opening is frequently affected, while the chancroidal virus rarely involves this gland. The syphilitic buboes are multiple, usually bilateral, painless, attain only moderate dimensions, and rarely suppurate. When suppuration takes place, however, it is from infection of the specific sore with the microorganisms of suppuration. In this case the resulting bubo will present the same clinical features as those due to chancroid.

Strangulated hernia and orchitis, or epididymitis, attacking an undescended testicle, may at the first glance suggest bubo. In the one case, however, characteristic symptoms of hernia will be present; in the other an examination of the scrotum will show absence of the testicle, and suggest the possibility that the symptoms are due to inflammation of this organ or its epididymis.

Prognosis.—The great majority of chancroidal buboes heal kindly. A certain percentage do not suppurate, but even if softening does take place the evacuation of their contents under proper antiseptic precautions is followed by rapid healing. Exceptionally the bubo becomes sloughing or gangrenous. A much more frequent complication in these cases is the formation of fistulæ, usually due to incomplete operation in the first place, or careless after-treatment of the wound.

Phimosis and Paraphimosis.—As a result of inflammatory swelling and œdema incident to chancroid of the foreskin, phimosis or paraphimosis may develop, or chancroids may be inoculated beneath a foreskin which is congenitally phimotic.

Phimosis, in case the chancroid is on the outer surface of the prepuce and easily accessible to treatment, is usually of slight consequence and yields readily to treatment. When, however, it invades the inner surface of the prepuce, the phimosis may absolutely prevent efficient treatment of the lesion, and by causing retention of pus may act as a potent factor in the development of buboes. The direct local effect of the retained secretions is to excite inflammation, so that a simple chancroid is liable to take on intense inflammatory action, to become sloughing, and to destroy not only the prepuce but to involve even the glans and body of the penis. In such cases, before the advent of the sloughing process, auto-inoculation may be of value in clearing the diagnosis. If the patient presents himself with a tight phimosis and a profuse, purulent discharge from the præputial orifice, it may be impossible to determine at once whether this discharge comes from a chancroid or from gonorrhœal inflammation of the urethra. By means of inoculations practiced on the body of the patient and by careful microscopical examination of the discharges, the presence or absence of one or both of these lesions can be determined.

In patients with a short prepuce, or those who habitually wear the foreskin retracted, swelling due to chancroid frequently occasions paraphimosis. This is a complication much less troublesome than phimosis, since it does not interfere with the direct treatment of the lesion. It may, however, reach such a point as to threaten gangrene by interference with blood supply, in which case prompt surgical intervention will be required.

Phagedena.—Chancroids may run an unusually severe course from the very beginning, or after progressing favorably may take on sudden violent inflammatory action. This is due not so much to the virulence of the original infection as to the lessened resistance of the tissues involved. This lessened resistance is often dependent upon a cachectic state. Thus phagedenic chancroids are particularly frequent in diabetics, scorbutics, or in the scrofulous.

The causes which increase local inflammation, and therefore lessen local tissue resistance, distinctly predispose to phagedena: thus bodily fatigue, uncleanliness, retention of discharge as in case of phimosis, chafing or rubbing of the parts as from sexual congress, may change the chancroid of ordinary type into an actively inflamed and finally phagedenic sore.

Phagedena may appear in the form of *limited sloughing*, or may run into *rapid gangrene*, causing in a few hours extensive destruction of parts. Thus in one reported case a patient suffering from chancroid was at first not led by the severity of his symptoms to seek professional advice. Noticing, however, sudden development and rapid extension of what he took to be gangrene, he repaired to the hospital, but on being examined after having arrived there, was found to have lost his penis *en route!*

The colored plate (XXIV, Fig. 2) represents the result of phagedena lasting not more than thirty-six hours before it was checked. This patient, originally of more than normal dimensions as to his penis, has lost, as the result of gangrene, not only all the skin and a portion of the glans, but the greater part of the corpora cavernosa, so that the penis is reduced to one third its normal length and a little over one third its normal thickness.

The sloughing process usually extends in the superficial fascia when, as is usually the case, a lesion is placed on the prepuce about the frænum, or in the coronary sulcus. It may, however, invade all the structures of the penis.

The advent of this complication is characterized by great increase in inflammatory swelling; by dusky coloration of the surrounding skin; by alteration of the discharge, the latter becoming thin, scanty, and blood-stained; and by the appearance of brown sloughs on the surface of the ulcer. In the beginning stage of sloughing the most pronounced symptoms are those of acute inflammation, the surrounding tissues assuming an erysipelatous appearance; and, indeed, the lesion has been termed erysipelatous. If the sloughing process be not very rapid or extensive, the surface of the ulcer is covered by a thick pseudo-membranous mass made up of necrotic tissue, softened by purulent discharge. Such a lesion is termed a *diphtheroid* chancroid. If there is a depraved or cachectic condition of the system, or marked local disturbance in circulation, such as occurs in phimosis or paraphimosis, or from continued irritation of the parts, rapid and extensive destruction of the tissue may set in, when chancroid becomes *gangrenous.*

The gangrenous process may occasion complete destruction of the penis, the scrotum may slough away, so that the testicles are without covering and the femoral vessels may be exposed. As the result of these rapid gangrenous processes, erosion of blood-vessels and violent hæmorrhage are by no means unknown.

In place of this rapid extension the sloughing process sometimes extends much more slowly. In this case the hyperacute inflammatory phenomena are absent, the ulcer progressively enlarges, exhibiting always unhealthy granulations, or greenish or blackish sloughs, and reaches sometimes enormous dimensions. The *chronic phagedenic chancroid* not infrequently extends irregularly in certain directions, healing in one part while the disease is actively extending in another. This gives it an irregular, serpentine course, which is suggestive of the name *serpiginous chancroid.*

Chronic phagedena never occurs in patients otherwise healthy. It is most frequently associated with syphilis, the tubercular diathesis, visceral diseases, and chronic alcoholism.

TREATMENT OF CHANCROID AND ITS COMPLICATIONS.

Treatment of Chancroid.—The *constitutional treatment* of chancroid is usually of minor importance; rest in bed, where this is possible, nourishing and easily digested food, regulation of the bowels, and the administration of a general tonic, such as the potassio-tartrate of iron, three to five grains, thrice daily, or the compound sirup of hypophosphites, one or two teaspoonfuls after meals, are all that will be required in simple cases. Sulphide of calcium, given in one-twelfth-grain doses every two hours, and bichloride of mercury, one forty-eighth grain, three times daily, have been warmly commended as possessing a marked beneficial influence on the course of the chancroid. If such influence is exerted, it is probably due to the general tonic effect of the drugs.

The end to be attained by *local treatment* of chancroid is the conversion of the unhealthy spreading ulcer into a surface of healthy granulations. Since it is universally conceded that the virulent properties of chancroid are dependent upon micro-organisms, antiseptics are theoretically suggested as the most serviceable application, and indeed clinical experience has proved that the employment of such remedies is followed by the best results. The antiseptics employed may be so mild as not to injure surrounding healthy tissue, or may be of such a nature as to cause total destruction not only of the chancroid but of all tissue immediately contiguous to it.

The basis of all formal treatment must rest upon thorough surgical cleanliness, not only of the sore but of the surrounding parts. For the accomplishment of this, weak lotions of carbolic acid or corrosive sublimate are preferable—the former in the strength of 1 to 40, the latter in the strength of 1 to 2,000. The chancroid and the skin about it should be washed repeatedly in one or the other of these lotions, if possible at intervals of two or three hours. All crusts must be removed from the surface of the lesions, and as far as possible the pultaceous necrotic tissue which conceals and protects the area of active extension must be cleaned away. This may be accomplished by peroxide of hydrogen, which should be sprayed into the lesion at intervals of one or two hours, or as frequently as is possible. Chancroids thus treated, even without the employment of any other therapeutic agents, will run a comparatively short course and heal in two to four weeks, especially if the patient is kept at rest. The lesions should be protected from chafing or rubbing of any kind, and should be so dressed that the healthy parts, which might be inoculated, are protected. In addition to this cleansing treatment which should be employed, no matter what other local applications are used, the chancroid may be cauterized, dressed with wet compresses, dry dressed, or subjected to the influence of prolonged hot compresses or baths.

Cauterization of the chancroid is the safest routine treatment, since thus, if the procedure is properly carried out, the virulent properties of the lesion are immediately destroyed, and complications, such as phagedena and bubo, are avoided. The objection to this method of treating chancroids is founded upon the fact that the majority of these lesions, particularly in the well-to-do, will under milder treatment remain superficial, not spread widely, occasion little inconvenience, and heal in from two to four weeks. This is so generally true that cauterization need not be insisted on when patients present themselves who are able to carry out all the details of conservative local treatment, and whose lesions are not extensive and are not rapidly spreading.

Cauterization should be practised, as a rule, upon dispensary patients, and upon the ignorant or careless; when the lesion is seen early and is not markedly inflamed; or when it is extending rapidly. In case inflammatory phenomena are unusually well marked, the employment of a cauterant may so add to the local congestion and œdema that sloughing may result. When, however, sloughing has actually begun and shows no tendency toward self-limitation, cauterization should be applied thoroughly.

Chancroids seen after the first ten days or two weeks may already be in their healing stage, either from having lost their virulent properties as a result of treatment, or simply because the disease has run its course. Under such circumstances cauterization is of course unnecessary. If the sore is seen late and is still unhealthy and extending, its complete destruction is indicated quite as clearly as when it is seen early in its course. The chronic and serpiginous chancroids yield more promptly to cauterization than to all other treatments combined.

For cauterizing chancroids, zinc chloride, copper sulphate, the mineral acids, caustic potash, bromine, iodine, nitrate of silver, and the actual cautery have all been advised. By far the best means is the actual cautery, either the glowing iron, the Paquelin apparatus, or the galvanic cautery being employed. If the actual cautery can not be used, strong nitric acid or liquid carbolic acid may be employed. The paste made by mixing together charcoal and commercial sulphuric acid was for many years a favorite application for burning these sores, since not only were the latter robbed of their virulent properties by the acid, but on neutralization and evaporation of the latter there was left a clean, dry dressing, which on dropping out in a few days exposed a surface of healthy granulations. The objections to this paste are that it is not sufficiently penetrating and that it so crusts the lesion that discharges are retained; hence, if cauterization has not absolutely destroyed the virus of the lesion, pus may accumulate, the ulcer may increase in size, and the development of chancroidal buboes may be encouraged.

In applying the actual cautery the iron or wire should be brought to a white heat, and should then not only be rubbed well into every recess of the sloughing surface, but should be carried a little beyond the apparent limits of the ulcer. Sinuses should be laid open freely, so that the cautery may penetrate to their deepest parts, and the cut edges of such sinuses also should be seared. The customary antiseptic washing and spraying should precede and follow such cauterization, and the part should be wrapped in linen kept wet with dilute lead-water and alcohol equal parts, or lead-water and laudanum equal parts, for twenty-four hours. When the operation has been performed thoroughly, the charred crust will come away in three to five days, leaving a surface of healthy granulations. This surface should be washed or sprayed with mild antiseptics twice a day, and should be dressed with dusting powders such as calomel and zinc oxide equal parts, or with ointments such as one made up of salicylic acid twenty grains, albolene one ounce.

The pain of the cauterization is always severe; this may be avoided by spraying the lesion with a ten-per-cent cocaine solution before burning, or still more surely by injections of a two-per-cent cocaine solution under and about the lesion. When nitric acid is employed this is applied by means of a glass rod or a cotton mop. It is rubbed in thoroughly, pain being prevented by cocaine anæsthesia. It causes a dirty yellow slough, not so dry and clean as that resulting from the employment of the actual cautery. This slough should be washed with antiseptics, dried with absorbent cotton, and dusted with iodoform, till it separates, exposing a healthy ulcer.

Nitrate of silver should never be used in the abortive treatment of chancroids, though it is an admirable application for stimulating sluggish granulations after the virulent properties of the chancroids have been destroyed.

Dry Dressings.—Of the many powders which are employed in the dry treatment of chancroid the one most efficient is iodoform; this, in the strict interpretation of the word, is not ranked as an antiseptic, since of itself it has little or no inhibitory power over the growth of the germs. Iodoform only produces its effect when brought in contact with pus, and as the results of chemical changes incident to this contact (probably because of the formation of iodine).

It should be dusted on the lesion after thorough cleansing with peroxide of hydrogen and bichloride of mercury solution, but the precaution must be taken not to apply it so thickly and not to leave it in contact with the lesion so long that in combination with the drying secretions it forms a thick crust, beneath which the disease actively extends. Iodoform is only of service when it is in immediate contact with the diseased area. A crust formed by its admixture with the lesion discharges is no more efficient in checking the progress of the disease than would be the powder sprinkled on some other part of the body. Hence at each washing the powder remaining from the former dressing must be cleaned away as thoroughly as possible.

The objection to iodoform lies in its unpleasant odor. This, it is stated, can be overcome by mingling with it, in the proportion of one minim to the drachm, oil of cinnamon or oil of roses, or by mixing with it, in the proportion of one to five, finely pulverized coffee-beans. None of these mixtures, however, will entirely conceal the odor.

An excellent and most efficient way of applying the iodoform is in the form of an ethereal solution, one to ten. This sprayed into the clean lesion deposits the drug in the form of a fine powder upon the entire wound surface, since the ether, evaporating almost immediately, leaves the iodoform which has been dissolved in it deposited upon whatever surface it has been sprayed upon.

Iodol and the other substitutes for iodoform have not given entirely satisfactory results. This is possibly because they have a greater tendency to form crusts and thus prevent free drainage.

Salicylic acid and boric acid, either pure or mixed equal parts of each, act as mild continued antiseptics, since they are soluble in the secretions of the wounds and do not produce an undue amount of irritation.

Ointments possess the advantage over powders in that they have not the same tendency to dry, form crusts, and retain the discharges. They possess the disadvantage of acting much more feebly, since mixture of any of the antiseptics with fatty substances neutralizes to a greater or less extent the germicidal effect of the drug. Of the ointments the following will prove serviceable: Sulphate of copper, ten grains; vaseline one ounce; iodoform one drachm, vaseline seven drachms; red oxide of mercury two drachms, lanoline six drachms; nitrate of silver twenty grains, albolene one ounce; acid nitrate of mercury one drachm, vaseline seven drachms.

Ointments can also be made with boric acid, salicylic acid, and calomel as the active ingredients. Salves are particularly indicated where there is a tendency to form crusts, and where the patient's temperament, occupation, or surroundings are such that it is impossible for him to repeatedly cleanse the lesion.

Wet Dressings.—The continued application of mild astringent or antiseptic lotions is warmly commended by many experienced genito-urinary surgeons. Solutions so strong as to be almost cauterant in their action are frequently employed. Thus, Finger warmly commends a lotion of sulphate of copper twenty-five per cent; in this are dipped pledgets of cotton, and these are placed on the chancroid and changed every two hours. Cotton pledgets dipped in less irritating solutions, such as camphophenique, or carbolic acid 1 to 60, or bichloride of mercury 1 to 3,000, and changed so frequently that they are always kept moist with the antiseptic, are less liable to cause undue inflammatory reaction, and at the same time they prevent crusting and retention of discharges. If the stronger solutions are employed, such as liquor ferri chloridi or the sulphate of copper lotion, these are exchanged for milder applications as soon as the chancroid becomes converted into a healthy sore.

This wet dressing is serviceable when the patient can not or will not take the time and pains necessary for the frequent daily cleansing of the lesion which a free discharge requires, and when more vigorous antiseptic action is required than is afforded by ointments.

Under wet dressings may be considered the treatment of chancroids by means of *hot baths*. This has always been a favorite therapeutic measure in intractable cases, and is founded upon the fact that the chancroidal ulcer loses its specific properties at a comparatively low temperature. These baths may be local or general. The local bath may be given by soaking twice daily the diseased part—the penis, for instance—in water as hot as can be borne, and maintained at this temperature for one or two hours; or by giving the patient a sitz-bath continued for many hours. This local treatment is serviceable in phagedenic ulceration, converting in a few days a sloughing ulcer into a surface of healthy granulations which heals rapidly and kindly.

The general bath, particularly applicable to cases of phagedena and serpiginous ulceration, may be continued night and day for weeks, or even months; or the patient may remain in the bath only during the day.

Operations.—Two operative procedures have been suggested and indeed are warmly commended as efficient in securing the immediate cure of chancroid. One requires a thorough curetting of the ulcer, and subsequent washing of the seat of operation with 1-to-40 carbolic solution, or 1-to-2,000 sublimate, followed by the application of an iodoform dressing. The other consists in excision of the whole involved area and suture of the resulting wound, and an attempt to obtain union by first intention.

Petersen states that of one hundred and sixty-two cases treated by curetting, the average time for complete healing was about eight days, and that in not a single instance did buboes develop under this treatment.

The excision method is one not to be commended, since, in spite of most careful antiseptic precautions, the whole wound frequently becomes converted into a chancroid much worse than the one for which operation was undertaken.

Of the various means of treatment already noted, each has its warm advocates, and each if faithfully carried out will give satisfactory results. The methods which have been used with most success in the patients under my charge are the following: The chancroids and the regions surrounding them are thoroughly cleansed by means of sprays, these seeming not only to penetrate the sloughing surface of the lesions, but also to disinfect the surrounding skin more efficiently than lotions. The sprays used are first peroxide of hydrogen, a hard-rubber nozzle, of course, being required for this chemical; next comes carbolic-acid solution 1 to 40; each spray is used for one minute. After this cleansing, if the chancroid is uncomplicated, and if it has not attained large dimensions—that is, if it is no larger than the thumb or finger nail—and if a moderate increase of the inflammatory symptoms is not liable to cause phimosis or paraphimosis, a spray of a ten-per-cent cocaine solution is applied to the lesion, and the whole affected area, and a little beyond this into the healthy tissue, is destroyed by the application of commercial nitric acid. The seat of cauterization is then dusted with iodoform, a piece of absorbent cotton dipped in 1-to-40 carbolic solution is applied over this, and the dressing is held in place according to the position of the chancroid, either by drawing the foreskin forward, by a film of collodion, by a bandage, by a condom, or by means of swimming-tights and cotton packing. In case marked inflammatory swelling follows this application, the parts are wrapped in lint kept wet with a solution of lead-water and dilute alcohol, equal parts of each. Night and morning the seat of operation and the surrounding area are carefully sprayed with the peroxide, and the carbolic lotion and the dressing first described are applied; thus reinfection of the granulating surface is prevented. When iodoform is rejected on account of its odor or because of idiosyncrasy to its action, aristol, iodol, calomel, or zinc oxide can be used. When the slough comes away and a healthy granular surface is exposed with scanty secretion, iodoform and carbolic acid should be omitted in the dressing, the lesion should be touched with a four-per-cent solution of nitrate of silver once a day, and should be dressed with a bland dusting powder, such as zinc oxide, or with a mild antiseptic ointment.

When a patient presents himself with a chancroid which is attended with marked inflammatory swelling of the surrounding tissues, such irritative treatment is to be avoided, since, in the first place, a cauterant will often not penetrate to a sufficient depth to totally destroy the virus, and finally an added irritant may cause such a rapid increase in congestion and exudation as to favor the conversion of the lesion into a phagedenic sore. Under these circumstances attempts at abortive treatment are no longer advisable. The same cleansing spray should be employed as before, followed by iodoform. For the application of this a spray of iodoform-ether (ten per cent) will be found most efficient; the application of a cotton compress soaked in carbolic acid completes the dressing. The inflamed part is then wrapped in lint, which must be kept wet with the lead-water and alcohol lotion, and the patient is directed to remain in bed. Where discharge is free and inflammatory symptoms are pronounced, this dressing must be renewed every one or two hours.

If the chancroid is still further complicated by sloughing, which, though well marked, does not seem to be rapidly progressing, or even if phagedena is active and progressive, the treatment already mentioned should be supplemented by continuous hot baths in antiseptic solutions. If the lesion is placed upon the penis or scrotum alone, these parts can be bathed in a hot solution for one or two hours at a time, the treatment being repeated three or four times a day. Where the chancroids are multiple they may be treated by means of a prolonged sitz-bath, or even by means of a general bath continued through the entire day.

When chancroid is complicated by phimosis so tight that it is impossible to make applications directly to the surface of the ulcer, the præputial sac should be washed out every two hours with carbolic lotion 1 to 60, or bichloride solution 1 to 4,000. It should then be syringed with a ten-per-cent iodoform-glycerin mixture, and inflammatory swelling should be allayed by keeping the penis wrapped in lint kept wet with lead-water and alcohol.

If, in spite of this treatment, inflammatory symptoms increase, the swelling becomes more marked, and particularly if the surface of the foreskin assumes a bluish tint, the latter should be at once slit up along its dorsum, so that the chancroid can be thoroughly exposed. The original lesion is treated in accordance with the methods already described. Usually the line of incision will also take on chancroidal inflammation. This may sometimes be prevented by the liberal use of peroxide and carbolic-acid sprays, and particularly by prolonged hot soakings of the affected part in mild antiseptic solution, such as 1 to 10,000 bichloride.

The objection to circumcision, under these circumstances, depends upon the fact that the wound is very frequently inoculated with the chancroidal virus, and will become shortly converted into a circular chancroid. I have five times performed circumcision in cases of inflammatory phimosis due to sub-preputial chancroid, and, in spite of the most elaborate precautions, have in each instance had the entire operation wound converted into a circular chancroid.

The serpiginous chancroid rarely yields in the slightest degree to ordinary local treatment. Before cure can be expected, the underlying constitutional dyscrasia must be corrected. When these lesions are encountered, the existence of syphilis should always be inquired into most carefully, since many serpiginous ulcers are in reality manifestations of tertiary syphilis, occurring coincidently with chancroid. When there is a specific history, constitutional treatment should always be tried. Malaria, struma, diabetes, must each receive its appropriate treatment. Tonics, stimulants, and nourishing foods are always indicated. The potassio-tartrate of iron is said to be particularly serviceable. Opium has also been warmly advocated, and should be given in grain doses once or twice a day. It is in this class of lesions that prolonged general warm baths have been most successful. The patients should have the entire body immersed in these baths night and day for weeks at a time. One such case I had under my care. He had resisted all treatment (including the actual cautery applied three times) for three years. The sore extended almost to the umbilicus, exposed the sheaths of the femoral vessels, and laid bare the entire groin. After three weeks of continuous warm bathing almost complete cicatrization was accomplished. The healing process continued after the patient was removed from the bath, and two months after the beginning of the treatment he was discharged cured.

The most potent local means of replacing the unhealthy ulcerating surfaces by vigorous granulations is found in the actual cautery. This must be applied thoroughly to the entire affected region. The after-treatment consists in the application of mild stimulants, such as a four-per-cent solution of nitrate of silver or sulphate of copper, dusting with iodoform or bismuth, and carefully protecting the granulations from external injury.

The Treatment of Chancroidal Buboes.—Buboes may be treated (1) by external applications, having for their object the prevention of suppuration or the absorption of pus when it is formed in small quantities; or, when the bubo is far advanced, the hastening of the suppurative process; (2) by medicaments carried directly to the focus of inflammation; (3) by surgical procedures, including (*a*) extirpation of the inflamed glands before suppuration is well advanced; (*b*) evacuation of the contents of suppurating buboes; (*c*) evacuation and curetting.

If the bubo is seen before pus formation has taken place—i. e., in the first three days of its development—the abortive treatment may be tried. This has for its object the prevention of suppuration. This end is sometimes attained by rest in bed, the application of heat, and pressure by means of hot shot-bags placed on the bubo, and by moderately free purgation. Internal remedies, such as sulphide of calcium, one-twelfth grain every two hours, or bichloride of mercury, one-forty-eighth grain three times a day, may also be administered.

The use of counter-irritants and resolvents, such as iodine painted around but not directly over the inflamed gland, or the application of an ointment made up of mercurial ointment one part, belladonna ointment one part, compound iodine ointment one part, together with pressure applied by means of a spica of the groin, is perhaps the most popular method of aborting buboes.

Probably the most important part of the abortive treatment is rest in bed, and by this means alone a certain percentage of chancroidal buboes can in their very earliest stage be prevented from going on to abscess formation.

Auspitz long since asserted that tincture of iodine never yielded satisfactory results in his hands, and an extended experience in the hospital service leads me to the conclusion that external applications of this drug are without value.

Spitschka prefers, above all other applications, a solution of subacetate of lead. The lotion is made up as follows: ℞ Powdered alum, five parts; solution of subacetate of lead, five parts; distilled water, five hundred parts. Compresses wet in this solution are applied to the swollen glands, and are kept in place by a pressure bandage. This dressing is changed two to five times a day. As a result, pain rapidly subsides, and often suppuration is prevented. Occasionally dermatitis results from this application. In addition to this treatment he warmly commends inunctions of mercurial ointment; one drachm of this is rubbed in about the inflamed region every day. Painting with tincture of iodine, ice poultices, and all other treatment he considers utterly useless.

Injection.—The injections of antiseptic materials, such as bichloride of mercury and carbolic-acid solution, are highly commended as means of aborting buboes. The first solution occasioned violent pain in Spitschka's hands; the second was not followed by satisfactory results. Puncture and aspiration were likewise abandoned as unsatisfactory. All these treatments after a time gave place to removal of the diseased glands and the neighboring affected tissues.

Welander reports extraordinary results in the treatment of non-suppurating buboes from the injection of benzoate of mercury. These results are in the main confirmed by Spitschka. The method consists in the injection of fifteen to thirty drops of a one-per-cent solution of benzoate of mercury. The needle is entered at two or more points. The immediate result is an increase in the pain and local inflammatory phenomena, and some general fever. After one or two days the inflammation subsides, and prompt resolution takes place in the great majority of buboes which are not fluctuating.

One treatment was sometimes insufficient; in this case the injections were repeated. When fluctuation became more marked after injection, and on repetition of the treatment there was no tendency toward resolution, the contents of the abscess were aspirated through the aspirating needle, fifteen to thirty drops of the benzoate of mercury solution were injected, and a compress wet in a two-per-cent solution of acetate of aluminium and held in place by pressure bandage was applied. Aspiration was not very successful, since the wound made by the needle had enlarged in twenty-four hours, and there was a discharge through this opening. Better results followed a puncture made by the bistoury, this puncture being kept open by a small strip of iodoform gauze. In a few days discharge ceased, surrounding inflammatory involvement disappeared, and prompt healing took place. Only exceptionally did the wound present the characteristics of chancroidal ulceration. In the few cases noted this was always due to the fact that there was a diseased superficial gland through which the needle had been completely driven, the injection thus being carried beyond it. Where in spite of this treatment abscesses formed, they were thoroughly washed out with 1-to-1,000 sublimate and received a careful antiseptic dressing; this dressing was reapplied every two or three days.

Of sixty-two patients treated in this way, twenty-three were cured by injection alone; in thirteen, puncture and antiseptic dressings were required; in twenty-six suppurating cases, incision was necessary.

Of the cases cured by injection, a number showed distinct fluctuation. Even when injections were not successful in preventing further suppuration, they so acted that all the involved glands became completely liquefied, thus rendering unnecessary the dissection often required when these glands are only partially destroyed—a procedure which is at times both tedious and dangerous. Another advantage claimed by Spitschka is, that the injection treatment allows a number of lymphatic glands to remain untouched, which in operation would be removed, and that thus extensive scarring is avoided in the inguinal region.

In whatever way suppurating inguinal buboes are treated, it must be borne in mind that in the great majority of cases, possibly in all cases, the contents of these buboes are absolutely free from germs; that after minute attention is paid to antiseptic precautions the healing will be kind; and that the important point to observe in operation is to avoid infection, either with the virus or the chancroid if such exists, or with the ordinary pyogenic organisms. This point is worthy of some attention, since it is often held that the bubo is already infected with septic germs, and that antiseptic precautions are perfectly futile.

Operation.—The operative treatment of bubo consists in free incision, and excision of glands not yet entirely broken down, or when the suppurative process is further advanced in evacuation of the purulent and necrotic tissue and thorough curetting of the walls of the abscess. When the skin still preserves its vitality, none of this need be sacrificed. The opening must be long enough to allow for drainage, and when sinuses are formed—a complication particularly liable to occur when abortion of the bubo has been attempted unsuccessfully—they must be laid open freely. This sometimes necessitates very extensive wounds, but there should be no hesitation in carrying the incision as far as required. When the skin immediately overlying the chancroid is thin, blue, ulcerated either at one spot or in a number of places, this should be sacrificed, an oval-shaped piece being removed. After evacuation of the bubo the wound must be explored for glands which are involved in the suppurative process, but are not yet thoroughly broken down. These can usually be shelled out by the finger; but sometimes, when periadenitis is fairly well marked, they are tightly adherent and require dissection. This dissection must be carried out with great care where glands lying over the saphenous opening are involved, since a wound of the femoral vein may readily be inflicted by a careless operator. I have known this accident to occur twice, once with a fatal termination.

After removal of all markedly enlarged glands and thoroughly curetting the entire abscess cavity, the latter is painted with a chloride-of-zinc solution, sixty grains to the ounce of water, and is packed with sterile iodoform gauze. An antiseptic dressing is applied, and is kept in place by a spica of the groin. This dressing is renewed every two or three days, the packing being so placed that the wound is forced to heal from the bottom. If proper care has been taken there will be little or no suppuration from the most extensive wound, healthy granulations will form, and in from two to eight weeks, depending upon the size and depth of the wound, cicatrization will be completed. When the granulations become indolent they should be brushed with a four-per-cent solution of nitrate of silver at each dressing.

Pontan treats suppurating buboes by first thoroughly cleansing the neighboring parts with bichloride solution, puncturing the center of the tumor, allowing the pus to escape, finally injecting a ten-per-cent mixture of iodoform and fluid vaseline. An antiseptic dressing is applied over this. He claims cure in six or eight days.

Harvey treats non-suppurating buboes by first anæsthetizing the skin, after which twenty drops of a fifteen-per-cent solution of carbolic acid are injected into the center of each enlarged gland. One injection, he states, is often sufficient, and the patient is not obliged to take to his bed.

Teaclke, as soon as fluctuation is detected, makes an incision about one third of an inch long through which all the pus is allowed to escape. The cavity is then distended with tincture of iodine, this liquid being driven in by means of an ordinary gonorrhœa syringe. The fluid thus injected is pressed out, a thin antiseptic dressing is placed over the bubo, and this is covered with a large sponge, the latter being wide enough to overlap the entire inflamed area. In twenty-four hours this dressing is renewed, all fluid remaining within the sac being carefully pressed out. The patient is confined to bed for four or five days. Teaclke states that anæsthesia is not required for this procedure; that though pain is severe for a time, it is transitory, and claims for his method rapid cures.

Wertheim advises puncture of the suppurating bubo by means of a thick aspirating needle. Most of the pus is drawn off, and eight to ten drops of a four-per-cent solution of the muriate of ammonium are injected. As the fluid in the cavity accumulates it is again tapped. The injections are repeated daily at first, afterward at longer intervals.

Zeissl first carefully depilates the skin covering a bubo, puts the patient to bed, and applies compresses wet in a solution of subacetate of lead. These compresses are not allowed to dry. As soon as pus is formed it is evacuated by means of a small puncture. When in spite of drawing off the pus there are marked symptoms of inflammation, the skin must be freely laid open, and the abscess cavity curetted and packed.

In the treatment of bubo the best results in the long run would be obtained by immediate excision of the glands as soon as they become markedly inflamed, and closure of the resulting wound by suture. The majority of patients will not submit to this, since the surgeon is bound to inform them that in a certain percentage of these cases suppuration may be avoided by less radical measures. It is, however, a good rule to attempt abortion of the bubo not longer than three days. If no good results follow in this time, suppuration will almost certainly occur. Then excision should be advised, and, if this is not permitted, benzoate-of-mercury injections should be employed.

When after opening the bubo the wound becomes chancroidal in type, the treatment should be conducted according to the principles laid down in discussing chancroid. The radical treatment is thorough cauterization, the hot iron being employed. Thorough cleansing, iodoform applications, and in obstinate cases continued warm baths, will also yield good results in these cases.

CONDYLOMATA ACUMINATA.

Condylomata acuminata, or the so-called "venereal warts," differ from the condylomata found on other surfaces of the body mainly in the circumstance that they are encountered on or about the genitalia and grow from mucous surfaces.

They appear as small or large, discrete or confluent, moist or dry papillary overgrowths, springing particularly from the coronary sulcus, the inner surface and margin of the prepuce, the region of the frænum, the orifice of the urethra, and in women from the greater and lesser labia, the urethra, and the margins of the anus.

These warts occur quite independently of any venereal affection, though they are frequently associated with such affections, being due to the irritation incident to a purulent discharge. Thus the balano-posthitis, occasioned by gonorrhœa, or the irritation consequent on the discharges of a chancroid, a chancre, or a secondary specific lesion, are often quite sufficient to occasion papillary outgrowth. Such outgrowths are, however, as readily excited by simple balano-posthitis such as occurs in phimotic youths, or by other nonspecific inflammations or discharges. Not infrequently warts arise without any apparent cause.

Pathology.—As a result of irritation and maceration of the epithelium, or without apparent cause, the papillæ and the rete mucosum hypertrophy; the papillæ not only elongate, but also give out lateral branches, growing much as does a tree. Corresponding with this outgrowth there is a commensurate development of blood-vessels. The papilloma may grow not only in length but also in breadth, in the latter case appearing as a flat outgrowth.

It may be horny, but when it grows from the genital surfaces is usually soft and red. When condylomata are so placed that they are kept moist and abraded by the contact of skin or mucous membrane surfaces, a purulent, extremely offensive discharge usually occurs.

Etiology.—Though venereal warts are occasioned by irritating discharges such as those incident to neglect of ablutions, gonorrhœa, recurrent herpes, or local lesions of any kind, it is interesting to note that heat and moisture generally seem to be factors necessary to their development, since they are rare on the penis of the circumcised and of those with short foreskins; and in women they occur on skin surfaces, which are normally in contact, as between the buttocks and on the surface of the greater and lesser lips.

It has long been held that the secretion from venereal warts will, if inoculated upon healthy surfaces, produce a like lesion—in other words, that these outcroppings are due to a specific cause. This belief has recently obtained new life on the basis of investigations as to the causative relation of protozoa to disease; but thus far all that has been advanced upon the subject is purely speculative. It is true that cases are reported in which warts were acquired by men who had sexual congress with women suffering from similar lesions. It is probable that in these cases the irritating discharge sufficient to excite the first growth of lesions in the woman still persisted and was operative in the case of the man.

It is evident that there must exist a certain predisposition to the development of these outgrowths, since of many men who expose themselves to the same source of contagion an exceedingly small number develop papillomata. Some countenance is given to the theory of contagion by reported instances of several men acquiring warts from the same woman, and by the well-known clinical fact that when one wart develops on the sexual organ others are liable to follow.

Symptoms.—Condylomata usually appear in persons between fifteen and twenty-five years of age as highly vascular outgrowths, which may project from the skin surface as one or more threads, or appear as discrete, small-sized tuberous excrescences, or form by confluence large outgrowths resembling in appearance a raspberry, a cock's comb, or a red cauliflower. The confluent papillomata usually assumes the form into which they are molded by pressure of the surrounding parts.

When their surfaces are macerated, venereal warts bleed readily and are liable to become inflamed, involving the surrounding tissues in ulceration, which sometimes produces a cure by sloughing of the lesion. When placed within the urethra they occasion a moderate muco-purulent discharge, and, if accompanied by erosions of the surrounding parts, slight *ardor urinæ.* The urethral condylomata are usually placed at or very near the meatus, where they are readily recognized and removed. When they grow from within the margin of the anus, the mechanical irritation of the fæces often occasions ulceration with its attendant symptoms.

The main inconvenience occasioned by warts depends upon the interference with function incident to their excessive growth. Thus I have seen the glans penis almost entirely concealed by a luxuriant cauliflower excrescence of such a size as to prevent coitus. Similarly there may occur an enormous outgrowth about the labia and the anus of women; indeed, it is in this sex and in these regions that the excessive growths are most prone to occur.

Diagnosis.—Venereal warts can scarcely be confounded with any other lesion, excepting perhaps the mucous patch or condyloma latum and epithelioma.

The condyloma latum or mucous patch is distinguished by the fact that there is a history of syphilis and other signs of the disease, though it must not be forgotten that this lesion of secondary syphilis may excite pathologically a true papillary overgrowth almost identical in appearance with the overgrowth of condyloma acuminatum.

Epithelioma is rare in youth and early maturity; it ulcerates, grows rapidly, does not merely spring from the skin surface, but involves the surrounding tissues in a dense infiltrate, and is accompanied by a characteristic induration of the inguinal glands.

At the time the differential diagnosis is most important—i. e., at the beginning of the malignant growth—it is most difficult. Perhaps the most reliable point in this period of the disease will be the depth to which the malignant neoplasm involves the tissues from which it springs. Only by means of microscopic examination of sections from the outgrowth can a positive opinion be given, since clinical experience shows that the benign neoplasm is at times transformed into a malignant growth.

Prognosis. — Venereal warts, if kept clean, and protected from mechanical irritation, tend toward spontaneous recovery, though predictions as to when this result will occur can never be made with safety. If utterly neglected they are prone to become the center of ulcerating and suppurating areas, which may often be complicated by inflammatory buboes and exceptionally form the starting point of cancer. A wart found upon the sexual organs of an old person, even if characteristic in appearance, should always excite suspicion, since this benign neoplasm is comparatively rare after middle life, while malignant growths are by no means uncommon, and in their beginning period closely resemble the venereal wart.

Treatment.—With removal of the exciting cause venereal warts frequently disappear without direct treatment. Whatever condition a lesion presents, local irritation or discharge should first receive attention. Thus phimotic patients should be circumcised, urethral discharges should be prevented from coming in contact with the external parts, leucorrhœa should be cured, and when the warts occur about the anus, ulcers or fissures of this region should receive attention, as discharge from the vagina should be prevented from flowing over the region.

Complete removal of the papilloma and cauterization of the base from which it springs is the only reliable direct treatment. Ligature has been very justly discarded, Letzel mentioning the fact that he has personally seen tetanus follow in three cases thus treated. The objection urged against excision is, that these growths are extremely vascular, and that when they attain large dimensions free bleeding follows their removal. This bleeding is, however, easily controlled; indeed, it usually stops spontaneously, or, if it does not do this, moderate pressure or the application of the actual cautery will always prove effectual.

The method of operating on condylomata is as follows: Where the outgrowths are discrete and small, each is seized by a pair of rat-tooth forceps, drawn upward and removed, together with the tissues of its base, by a snip of the scissors. The little bleeding points left by this cutting are touched with pure carbolic acid and dusted with iodoform, and the dressing is complete. When the neoplasm has a large base, the whole outgrowth may be shaved off level with the surrounding surface by means of a sharp, flat knife. The wound left by this incision should be thoroughly curetted, and then should be cauterized with carbolic or nitric acid and dressed with iodoform or with calomel, or with a powder made up of calomel and zinc, equal parts of each.

A still more radical method of procedure, and one always applicable when the papilloma springs from the prepuce or skin surface, consists in dissecting out the entire base of the papilloma, and approximating the resulting wound by sutures. This operation, if properly performed, gives absolute assurance against recurrence of the lesion *in loco*.

In case the knife is objected to, cauterization of the papillomata may be practised by means of the hot iron or galvano-cautery, or strong acids or alkalies may be employed to destroy the neoplasm. Nitric acid is perhaps the favorite cauterant. When it is employed, the surrounding surfaces should be protected by the application of a little cosmoline, the acid should be well rubbed into the diseased part, and the dressing should consist of a piece of cotton or lint well covered with boric-acid ointment. The application is repeated every second or third day until the papillary layer of the skin is destroyed at the point of outgrowth.

When cauterant applications are imperfectly made they act as a powerful stimulant, causing the warts quickly to attain large dimensions.

Chromic acid is an excellent application, but is open to the objection that exceptionally it occasions general toxic symptoms. It is usually employed either pure or in a ten-per-cent solution, which is liberally brushed over the outgrowths once daily.

Caustic potash is one of the most efficient of the cauterant agents. An excellent method of using it is by means of the following prescription: Oxide of lead, two grains; thirty-three-per-cent solution of caustic potash, one drachm. This should be well shaken, and by means of a brush thoroughly applied to the lesions, which have previously been carefully cleansed and dried. One or two applications are sufficient.

There are conservative methods of treatment, many of them depending for their reputation upon the well-known fact that with the removal of the exciting cause these growths have a tendency toward spontaneous disappearance. All are uncertain, and should not give place to more radical methods when the latter are applicable. A favorite prescription is the following: ℞ Salicylic acid, one drachm; acetic acid, one fluidounce. S. Apply with a brush, once daily. A saturated solution of salicylic acid may be employed. This should be applied repeatedly. Other astringents, such as the liquor plumbi subacetatis and tincture of perchloride of iron, are frequently advised. After these applications have caused the papilloma to disappear, cauterization of the base usually will be necessary to prevent recurrence.

Venereal warts affecting the genitalia of women often grow rapidly during pregnancy, attaining extraordinary size. After delivery they become in part or wholly absorbed. This should be remembered in considering the advisability of operation under these circumstances.

CHANCROID OF THE ANUS AND RECTUM.

By JAMES P. TUTTLE, M. D.

The clinical appearances and course of chancroid are modified in a marked degree by the accident of location. The variations observed in the characteristics of chancroids of the rectum and anus may be accounted for by the anatomical and physiological relations of the parts, and the customary hygienic care devoted to them by the classes in which these affections are generally found. Be it said to the credit of the American nation, that primary venereal disease of the rectum and anus, or any other affection of these parts, due to sodomy or pæderasty, are extremely rare, and, though I have seen them in my clinical experience, it has rarely been in a native-born citizen.

The following table exhibits the comparative frequency of the disease at this point in the two sexes, as observed by different writers:

Fournier, in males...........1 in 445.
Fournier, in females.........1 in 9.
Perondi, in both sexes........2 in 83, both in women.
Debarge, in both sexes.......5 in 216.
Sturgis, in both sexes........8 in 83, all in females.

While the other authors have not so divided their observations that a proportionate frequency can be made out, one may easily infer from them that those of Fournier are not far from correct. The close proximity of the anus to the genital organs in the female, the facility with which all discharges from the vagina may come into contact with it, the liability of the male organ to touch it in coition, and the comparatively greater frequency of the practice of sodomy over that of pæderasty, account for the proportionately large number of these ulcers about the anus and rectum in women. In the large majority of cases they are not primary, but secondary to chancroids elsewhere, and therefore due to auto-inoculation.

About the anus and rectum these sores differ in character and appearance according to their location—whether they occur in the perianal, anal, or rectal tissues. In order to understand this, it is but necessary to refer to the constituent elements of these parts. The perianal region, composed of the perinæum, intergluteal and coccygeal surfaces, is covered with a horny, epithelial layer and a cutaneous tissue of considerable thickness. This region is richly endowed with sweat-glands, and sebaceous and hair follicles. It is constantly irritated by the friction of clothing, and of the surfaces against each other, and, bathed in the irritating secretions of the parts, the epithelial layer is constantly more or less macerated and abraded. It is easy to see, then, how virus may find a lodging-place in one of these follicles, and produce a pustular sore, or how it may be inoculated through the abrasion of surface, and how, having once been ingrafted here, it would spread as an erosion from one point to another. At the anus, besides there being a thin, muco-cutaneous tissue, full of veins and easily torn, the columns of Morgagni, or folds of mucous membrane, form sulci at their bases, which are frequently torn by hard fecal movements, and which are veritable nests for virus of any sort. Confined as the venereal virus may be in these parts, the ulcer which it produces takes on the conformation of the parts—follows the folds up and down and outward into the submucous and muscular tissues.

The rectum, though paved with columnar epithelium—a fact which has been held by some to render it insusceptible to venereal virus in general—is lined by millions of little follicles of Lieberkuhn, and has many sacculi or folds in its mucous membrane which furnish a resting-place for specific germs which may gain entrance into the organ. These surfaces are frequently abraded or torn by hardened fecal balls, which renders them liable to venereal infection. These sacculi or pockets, as a rule, run circularly around the rectum, and it is in this direction that the early venereal lesions usually extend. These facts explain to some extent the variation in chancroids of these parts from those found elsewhere.

Perianal Chancroids.—These have been appropriately termed by Mollière, *chancrelles interfessières*, owing to their appearing upon the perineal or coccygeal regions, especially the latter, where the folds of the buttocks lie in close contact. They possess the characteristics of erosions more than of ulcerations; they are shallow, show little tendency to spread, and do not secrete abundant pus. They are usually associated with similar sores elsewhere—so frequently, indeed, that one writer has termed them "satellites of other chancroids." Other authors doubt their chancroidal nature, and claim that they are only inflammatory phenomena; but the fact remains that these ulcers are auto-inoculable, and if Van Buren's statement that chancroids are the only ulcers possessing this characteristic is true, this fact ought to put the question at rest. These ulcers rarely become phagedenic, but if they extend at all it is generally in the direction of the folds of the buttocks, and not toward the anus. They are not painful, and frequently occur and pass away in the course of chancroids elsewhere, being mistaken by the patient for simple chafing. They tend to heal spontaneously, and are less liable to become chronic than any form of chancroid.

Anal Chancroids.—The mucous folds of the anus are largely confined to its anterior and posterior borders, and it is between these folds that a large majority of fissures occur. No better hiding-place could be conceived for the chancroidal germs than in these little crypts, and none which they could reach with greater facility in women. Chancroids occur here as little, grayish-yellow fissures between the folds, and might be overlooked except for the pain they give. They may be easily mistaken for simple fissures, unless careful attention be paid to their color, free secretion of pus, association with chancroids elsewhere, and auto-inoculability. They involve the cutaneous and subcutaneous tissues freely, but advance with difficulty and slowly upon the rectal mucous membrane. When they do extend into the rectum it is along one of the little sulci between the columns of Morgagni, until they reach the upper border of the internal sphincter. Over the level of this muscle they remain stationary, but spread circularly above and below, and thus take on an hour-glass shape.

They both advance and heal very slowly, their tendency to chronicity being one of their chief characteristics. From one sulcus they sometimes infect another and another, till the whole anal circumference is involved, and it presents a condition similar to that described as the preputial chancroidal crown. Their base is gray and sluggish, the pus is fetid, sometimes sanious, and occasionally little fistulas pass through the folds from one sulcus to another. In course of time their virulence may die out, leaving a simple chronic ulcer, which is not inoculable. Mollière says this is liable to occur if they be complicated with hæmorrhoids, and that the ulcer left is a simple varicose ulcer (Maladies du Rectum et de l'Anus, p. 679).

The extreme pain following defecation renders constipation the rule in these patients. We are speaking now of anal chancroids, and the patients suffer all the consequent symptoms of irregular bowels, anal irritation, loss of sleep, and shock from excessive pain when the movement has become necessary. The pain is severest after stool, sometimes amounting to almost agony for hours. Unlike the former class, they do not tend to heal spontaneously, but under judicious care most of them get well without any unfortunate sequences. The bowels should be kept open and the parts thoroughly clean. A gentle but thorough touching of the ulcer with equal parts of carbolic acid and tincture of iodine, followed by frequent washings with lime water or black wash, and the application of a powder composed of equal parts of calomel and oxide of zinc, usually suffices to heal them in a week or two. The speculum should be introduced in order to treat the whole ulcer. When the pain is intense, and due to spasm of the sphincter, one must have recourse to the knife or forcible stretching of the sphincter, as in simple fissure; but this should not be done hastily, for Ricord and Fournier have each had serious results follow this practice in chancroids of the anus.

Other cauterizing agents and other powders may take the place of those above mentioned, but none have acted better in my hands, and they are free from stain and odor. Occasionally iodoform seems to have a specific influence upon these ulcers, but it is rarely necessary to make use of such a disagreeable agent.

Rectal Chancroids.—Chancroids of the rectum are very rare. They are due to unnatural intercourse, and their true history is scarcely attainable. The fact that mucous membrane covered with columnar epithelium seems to be refractory to gonorrhœal, chancroidal, or syphilitic virus, justifies the doubt of their existence. They do exist, however, and may be diagnosed by their character and auto-inoculation. "Ulceration of the rectum," says Kelsey, "begins in the rectum proper, well above the sphincter, and not at the skin of the anus, except in some rare cases of lupus, tubercular disease, and rodent ulcers" (Diseases of the Rectum and Anus, p. 326). It is almost impossible for these sores to be the sequence of sores elsewhere in the body, even at the anus, for the sphincter, constantly closing tight this aperture, acts as a barrier to advancing germs, and the daily fecal movements sweep out before them those that may have nearly gained the orifice. Those that have been seen have generally been associated with others upon or about the anus, and with an erythema of the groove between the buttocks; but it is much more logical to conclude that these are the result of inoculation from the upper chancroid than *vice versa*, for in that case the lower part would necessarily be bathed with the purulent discharge from above. These chancroids are situated above the sphincter, are of an irregular shape, grayish in color, with pale, feeble granulations, and they discharge an abundant, sanious, and irritating pus. Their symptoms are obscure, "diarrhœa and discharge from the rectum" being about all the patient is willing to confess that he knows about the case. The ulcers are generally shallow, with clean-cut borders, and comparatively stationary. Occasionally they show a tendency to deep ulceration, invading the submucous and muscular coats of the bowel and destroying the sphincter. Under such circumstances they may become the starting point of fistulas, which may or may not open upon the skin. This fact should be borne in mind, for in treating them a burrowing fistulous tract may be overlooked which will render all our efforts vain.

Their management consists in regulation of the bowels, irrigation of the rectum with an antiseptic solution, such as a fifty-per-cent saturated solution of boric acid, and the application of astringents or mildly cauterizing agents to the ulcer itself. If the ulceration is large, the patient should be confined to bed and kept upon a strictly milk or fluid diet.

Phagedenic Chancroid.—This is, in my opinion, the most malignant and distressing of all venereal diseases. It is due to a peculiar constitutional condition which renders the tissues rich and palatable morsels for the chancroidal virus to feed upon. This is proved by the fact that if a healthy person is inoculated from a phagedenic chancroid he develops only a simple soft sore; on the other hand, if a patient suffering from phagedenic chancroid be inoculated from a simple chancroid, the point of inoculation will take on phagedenic symptoms (Diday and Doyon, Thér. des Malad. Vénér. et de Malad. Cutan., 1876, p. 184). It may be acute or chronic.

In the *acute form* it resembles an intense cellulitis or erysipelatous inflammation. Its march is rapid and devastating in all directions. The deep tissues as well as the superficial are involved in the destructive processes; the parts become swollen, angry, tender, and œdematous, the temperature is elevated, the pulse rapid and feeble, the tongue dry and pasty, vast suppurating cavities form in the parts, and the lymphatics soon become inflamed and suppurate. The pus from these buboes is non-inoculable, and they have been called by Rollet sympathetic buboes. The symptoms of this condition are in no way connected with the virus of chancroid, and one is justified in holding that such cases are nothing more than pyæmia, due to the absorption of simple pus from the chancroidal ulceration. Metastatic abscesses may develop in other portions of the body, the patient's strength fails rapidly, and unless radical measures are adopted and successful the disease is very likely to prove fatal; otherwise the patient recovers through a prolonged convalescence, with large cicatrices covering the region of the sloughs.

The *chronic form* is less alarming and less dangerous to life, but equally as trying to the physician. It is the one form of ulceration that shows a tendency to extend from without into the rectum. It advances slowly over a large area, cicatrizing at one point while it invades another. It remains auto-inoculable throughout, is apyretic, and only slightly painful. Lymphatic engorgement does take place, but the glands do not usually suppurate. The destruction of tissue is not usually very deep, but sufficiently so to involve the submucous and sometimes the muscular walls of the rectum. Were this not the case, there would never have been any question as to its producing stricture. Ulceration involving the mucous membrane alone leaves no trace or contraction after it has healed. The contraction, thickening, or fibroid deposit is in the deeper tissue, and not in the mucous membrane. Much argument and time have been consumed upon the chancroid as a cause of stricture. Extreme views have been taken upon both sides, some holding that it is the only venereal cause of stricture of the rectum, others that it never occasions stricture. No one has offered any proof that simple chancroids of the anus and perineal re gion ever become the cause of stricture, except by producing reflex contraction and consequent atrophy of the levator-ani muscle, as described by Mr. Cripps; but Van Buren says, "I have seen chancroids at the anus become phagedenic and extend into the rectum, and have verified at a later period the existence of stricture of the rectum from cicatrization, as there was every reason to believe, of this same ulceration" (Lect. upon Dis. of the Rectum and Anus, 1881, p. 237).

As it would require much repetition of what has already been said on the subject of stricture, under the head of Syphilis of the Rectum and Anus, it is thought best not to enter into the discussion here. Suffice it to say that the weight of authority seems to sustain the view that stricture of the rectum may be produced by phagedenic chancroids or by chancroids with much inflammation within the rectum.

Treatment.—In the treatment of phagedenic chancroids, both a local and constitutional condition confronts us. To succeed, we must attack it at both these points. In the acute variety the parts should be kept as clean as possible, the pus cavity should be evacuated, washed antiseptically, and drained as soon as it forms.

Hot antiseptic poultices should be frequently applied, to encourage the circulation in the parts and assist in throwing off the sloughs. The temperature should be controlled by cold baths or antipyretics, and iron and quinine should be freely administered. In short, the principles of antiseptic surgery should be applied without reference to the peculiar chancroidal virus.

In the chronic form there seems to be a lowered vitality of the parts, which makes them unable to resist the ravages of the disease, so that only a strong barrier of healthy granulation is able to check its march. Mild cauterizing agents, such as nitrate of silver, sometimes suffice to check it, but frequently more radical measures are called for. Nitric or chromic acid, caustic potash, or, as a last resort, the actual cautery, will sometimes be necessary. Every point in the base or circumference should be touched with the cauterizing agent, and the principles of antisepsis applied here as above. If the ulceration be largely within the rectum, it will be very difficult to reach it with the Paquelin or actual cautery, and it will be best to confine ourselves to the acids and to frequent lavements.

One can not be too careful of the condition of his patient before applying the cautery in these cases. I have seen a patient die from shock within two hours of the application of the actual cautery to a phagedenic chancroid. I believe the condition is essentially a nerve exhaustion affecting the trophic centers, and before we adopt such radical measures we should give our patient the advantage of rest in bed, strong nerve tonics, good food, electricity, and massage. Under this treatment chancroids will frequently cease to advance, whereas they had gone steadily on before in spite of cautery and astringents. The surrounding parts should be carefully protected and the dressings changed frequently to prevent auto-inoculation. Sometimes even these radical measures fail, and recourse must be had to a surgical operation, as in the case reported by Maclaren (Edinb. Clin. and Pathological Jour., 1883, p. 697). It was the case of a woman with "serpiginous phagedenic chancroidal ulceration," of eight years' standing, which had been cauterized and treated in the ordinary way a number of times, but without material improvement. It began in the vagina, spread over the labia to the perinæum and posterior anal groove, but did not ascend into the rectum. Her cure was accomplished by scraping off the granulations throughout the ulcer, paring, dissecting up, and bringing the edges as nearly together as possible by button sutures, at the same time administering strong tonics and regulating her diet. It was noticed in this case that contact of the menstrual discharges with the parts that had already healed would cause them to break down again. The vagina was therefore tamponned, and kept so during her monthly periods, until some time after recovery. This indicates the necessity of protecting these ulcers from all irritating discharges, and also the possibility of checking their advance by clean-cut dissection of their edges. If such can be done it would certainly be better surgery, less painful to the patient, and not so likely to produce shock or leave a contracting cicatrix as the cautery.

Complications.—Chancroid of the anus and rectum may be complicated by true syphilitic chancre and by other syphilides. The dual sore presents no characteristic features at first. A typical chancroid may develop and proceed in its regular course almost to cicatrization, when suddenly it will enlarge at its base, become indurated, and present all the characteristics of true chancre. At the same time this sore continues to secrete more abundant pus than a chancre, and remains auto-inoculable. Nevertheless, it contains the germs of syphilis, and eventually produces the constitutional manifestations thereof.

When they are complicated by later syphilides the diagnosis is very difficult. Mucous patches and syphilitic ulcerations may occur about the anus and rectum, and so much resemble chancroidal ulceration that it is impossible to distinguish between them. Inoculation may prove the existence of chancroid, but it throws no light upon the syphilitic element in the case, and unless there be other evidence of the constitutional disease we should treat such sores as simple chancroids, being constantly on the alert to discover any signs of systemic invasion.

Fistulæ of various forms may be found in chancroidal ulcerations of the rectum and anus. We have already alluded to the short fistulous tracts leading through the mucous folds from one sulcus to another, and to the complete and incomplete fistulas complicating phagedenic chancroids within the rectum. There yet remains another and more frequent form seen with chancroidal ulcerations of the margin of the anus. These are small submucous fistulas running upward for an inch or more along the line of the columns of Morgagni. They seem to be due to the chancroidal virus destroying the submucous cellular tissue, while the mucous membrane resists its invasion. They may be complete or incomplete. The latter is more frequently the case, and unless the little fissurelike chancroids are examined carefully with a very fine probe, these little fistulous tracts are liable to be overlooked. In such cases their continuous discharge keeps up the ulceration below in spite of all our treatment. It is a question in such cases whether a surgical operation is justifiable, seeing that it exposes a fresh wound to the chancroidal pus. My practice has been to lay them open thoroughly and cauterize them with ninety-five per cent carbolic acid. The results have been uniformly good, but my experience is limited, and if the patient showed the least tendency to phagedena I should try the cauterizing agents, applied by a fine probe, before cutting. There is no danger of incontinence in these cases, for even in the phagedenic form the fistulous tract usually, and in the other forms always, passes between the mucous membrane and the sphincter muscle.

INDEX.

Abortion from syphilis, 32.
Acne-form pustular syphilide, 174.
Adenopathy, in constitutional syphilis, 116.
  primary, 80.
Air-passages, upper, syphilis of, 317.
  effect of certain acute processes upon, 360.
  historical sketch of, 317.
Albuminuria in syphilis, 466.
Alcoholism and syphilis, 53, 134.
Alopecia, syphilitic, 207.
  of axillæ, 210.
  of beard, 210.
  cranial, 208.
  diagnosis of, 210.
    areata, 211.
    premature, 211.
    senile, 211.
    symptomatic, 211.
  of eyebrows and eyelashes, 210.
  of genitals, 210.
  hereditary, 648.
  prognosis of, 212.
  treatment of, 212.
Aneurism of heart, due to syphilis, 377.
Animals, syphilis in, 58.
Ano-rectal syphiloma, 426.
Anus, syphilitic affections of (see SYPHILIS OF RECTUM).
  chancre of, 417.
  chancroid of, 895.
Aponeuroses, syphilis of, 263.
Army statistics of syphilis, 815.
Arterio-sclerosis, syphilitic, 379.
Arthralgia, 255.
Arthropathies of syphilis, 255.
  varieties of, 255.
Asthma, syphilitic, 378.
Asymmetry of cranium, in hereditary syphilis, 524.
Ataxia, locomotor, in syphilis, 499.
Atrophy of optic nerve, cerebral, 565.
  inflammatory, 565.
  spinal, 565.
  in syphilis, 565.
Atrophy of muscles in syphilis, 261.
Auditory nerve, syphilis of, 601.
Auto-inoculation (see CHANCROID).

Baths, in treatment of syphilis, 785.
Benign rapid syphilis, 132.
Bladder, syphilis of, 464.
Blood, in syphilis, 55, 86.
  in constitutional syphilis, 110.
Blood-corpuscles in syphilis, 111.
Blood-vessels, syphilis of, 378.
  arterio-sclerosis, 379.
  degeneration of, hyaline, 381.
  endarteritis, 380.
  infiltration of, amyloid, 382.
  periarteritis, gummatous, 381.
  symptoms of, 382.
  treatment of, 382.
Bones, syphilis of, 1, 265.
  in acquired syphilis, 274.
    primary stage, 274.
    secondary stage, 275.
    tertiary stage, 276.
  diagnosis of, 294.
  differential diagnosis of, 297.
  enostosis, 268.
  exostosis, 268, 573.
  gummata of, 265.
  in hereditary syphilis, 280.
    differential diagnosis of, 290.
  hyperostosis, 268.
  nodes, 268.
  osteitis, 267.
    formative, 268.
    rarefying, 267.
  osteophytes, 268.

- Bones, periostitis, 266.
  - prognosis of, 301.
  - treatment of, 302.
- Brain and meninges, syphilis of, 481.
  - of cortex, 483.
  - of crus, 488.
  - gumma of, 481, 523.
  - of larger ganglia, 486.
  - of medulla, 488.
  - palsies, oculomotor, 490.
  - of pons, 488.
  - symptomatology of, 483.
- Breast, chancre of, 83.
- Bronchi, syphilis of, 350.
- Bubo, chancroidal, 870.
  - diagnosis of, 874.
  - etiology of, 870.
  - prognosis of, 874.
  - symptoms of, 873.
  - syphilitic, 80.
  - treatment of, 884.
    - by injection, 885.
    - by operation, 886.
- Bullous syphilides, 146.
- Bursæ, syphilis of, 262.
- Bursitis, syphilitic, 262.
  - acute, 262.
  - chronic, 262.
  - gummatous, 262.
  - irritative, 262.

- Cachexia, syphilitic, 120.
- Capillaries, syphilis of, 381.
- Caries of orbital walls, in syphilis, 572.
- Cartilages, syphilitic affections of, 256.
- Cataract, in hereditary syphilis, 580.
- Cauterisatio provocatoria, 122, 136.
- Cerebro-spinal syphilis, multiple, 502.
- Cervix uteri, syphilis of, 462.
- Chancre, 73.
  - anatomical structure of, 74.
  - cauterization of, 720.
  - contagion, modes of, 54, 61, 604.
  - erratic, 86.
  - excision of, 720.
  - Hunterian, 77.
  - induration of, 74.
    - involution of, 74.
  - local treatment of, 801.
  - location of, 68, 81.
    - anus, 83, 417.
    - auricle, 583.
    - balano-preputial fold, 81.
- Chancre of breast, 83.
    - cephalic, 84.
    - cheek, mucous membrane of, 227.
    - conjunctiva, 548.
    - extra-genital, 83.
    - of eyelid, 545.
    - in females, 82, 455.
    - finger, 85.
    - fourchette, 82.
    - genitals, 81.
    - gingivo-labial fold, 226.
    - glans, 82.
    - gum, 226.
    - head, 84.
    - labium majus, 82.
    - larvé, 82.
    - lips, 85, 224.
    - meatus, 82.
    - mouth, 84, 223.
    - nose, 324.
    - os uteri, 462.
    - palate, soft, 227.
    - penis, 437.
    - pharynx, 331.
    - prepuce, 82.
    - rectum, 83.
    - sulcus, 81.
    - tongue, 85, 226.
    - tonsil, 85.
    - urethra, 444, 461.
    - uterus, 82.
    - vagina, 83, 461.
    - vulva, 455.
  - "mixed," 79, 868.
  - nonsyphilitic, 78.
  - number of, 75.
  - prognosis of, 95.
  - simple, 78, 853.
    - diagnosis of, 88.
  - soft, 853.
  - syphilitic, 78.
  - varieties of, 76.
    - the dry scaling papule, 76.
    - the superficial erosion, 77.
    - the ulcerating initial lesion, 77.
- Chancroid, and its complications, 853.
  - of anus, 895.
  - clinical features of, 864.
  - complications of, 869.
    - bubo, 870.
    - lymphadenitis, 870.
    - lymphangitis, 869.
    - paraphimosis, 874.

Chancroid, complications of, phagedena, 875.
    phimosis, 874.
  definition of, 853.
  diagnosis of, 866.
  etiology of, 854.
  frequency of, 860.
  history of, 854.
  inoculability of, 859.
  location of, 861.
  nervous symptoms following, 475.
  pathology of, 864.
  perianal. 894.
  phagedenic, 897.
  serpiginous, 200.
  treatment of, 877.
    by cauterization, 878.
    constitutional, 877.
    by dry dressing, 879.
    by operative procedures, 881.
  varieties of, 863.
Cheek, chancre of mucous membrane of, 227.
Choc en retour, syphilis by conception, 67, 611.
Chorea, in syphilis, 531.
Choroid, syphilis of, 558.
  diagnosis of, 559.
  hereditary, 579.
    prognosis of, 580.
    treatment of, 580.
  ophthalmoscopic appearance of, 559.
  symptoms of, 559.
  treatment of, 560.
Cicatrices, of syphilitic lesions, 128.
  in syphilis of mouth, 252.
Ciliary body, syphilis of, 557.
  cyclitis, 557.
  diagnosis of, 557.
  gummosa of, 557.
  hereditary, 578.
  symptoms of, 578.
Circulatory system, syphilis of, 378.
  blood-vessels, 378.
  heart, 374.
Climate, effect on syphilis, 134.
Colles-Baumés law, 52.
Colles law, 32, 66, 614.
Condylomata acuminata, 888.
    etiology of, 889.
    diagnosis of, 890.
    pathology of, 889.
    prognosis of, 890.
    symptoms of, 889.
    treatment of, 891.
Condylomata lata, 165.
    of larynx, 340.
    of meatus of ear, 590.
Congenital syphilis (see HEREDITARY SYPHILIS).
Conjunctiva, syphilis of, 548.
  chancre of, 548.
  conjunctivitis, 548.
  gummata of, 550.
  hereditary, 575.
  lesions of, secondary, 549.
  mucous patches of, 549.
  ulcers of, 550.
Contagion, of syphilis (see INFECTION OF SYPHILIS).
Contagious disease acts and syphilis. 709.
Convulsions due to syphilis, 485.
Cornea, syphilis of, 550.
  gummatous infiltration of, 552.
  hereditary, 576.
  keratitis, interstitial, 550.
    parenchymatous, 576.
    punctata, 551.
Corneous syphilide, 162.
Corona veneris, 157.
Corpora cavernosa, syphilis of, 443.
Cranium, in hereditary syphilis, asymmetry of, 524.
  hydrocephalic, 524.
Crustaceous syphilide, 160.
Crystalline lens. syphilis of, 560.
Cupping, syphilis propagated by, 65.

Dactylitis, syphilitic, 304.
  diagnosis of, 313.
  prognosis of, 316.
  symptoms of, 306.
  treatment of, 316.
Deafness caused by syphilis, 595, 601.
Dementia paralytica following syphilis, 507.
  temporary, 506.
Demographic relations of syphilis, 833.
Diagnosis of syphilis, 661.
Diatheses, influence on syphilis, 135.
Dualist theory, 21, 79, 105.

Ear, syphilis of, 583.
  acquired, 583.
  of auricle, 583.
    chancre of, 583.
    diagnosis of, 586.
    eruptions of, 585.

- Ear, gummata of, 587.
  - congenital, 600.
    - treatment of, 602.
  - of labyrinth. 598.
    - congenital, 600.
    - treatment of, 598.
  - of meatus, 589.
    - condylomata of, 590.
    - diagnosis of, 592.
    - exostosis of. 590.
    - prognosis of, 592.
    - treatment of, 592.
  - of membrana tympani, 593.
    - gummata of, 593.
  - of tympanum, 593.
    - neuroses of, 597.
    - otitis catarrhalis adhæsiva, 596.
    - otitis catarrhalis secernens, 594.
    - otitis media suppurativa, 595.
- Ecthyma-form pustular syphilide, 177.
- Eczematous diathesis and syphilis, 135.
- Eczematous syphilide, 169.
- Encephalitis, 528.
- Endarteritis, syphilitic, 380.
- Enostosis, syphilitic, 268.
- Ependymitis, 529.
- Epididymis and cord, syphilis of, 448, 649.
  - differential diagnosis of, 452.
  - manifestations of, secondary, 452.
- Epiglottis in syphilis, 340.
- Epilepsy, 484, 531.
- Erb's type of spinal syphilis, 498.
- Erysipelas, influence in checking syphilis, 136, 806.
- Erythematous syphilide, 147.
  - macular, 147.
  - maculo-papular, 148.
- Etiology of syphilis, acquired, 39.
  - hereditary, 630.
- Eustachian catheterization, infection by, 65.
- Exostosis, in syphilis, 268, 573.
- Eye and its appendages, syphilis of, 539.
  - of canaliculi, 541.
  - of choroid, 558.
    - diagnosis of, 559.
    - hereditary, 579.
    - symptoms of, 559.
    - treatment of, 560.
  - of ciliary body, 557.
    - cyclitis, 557.
    - diagnosis of, 557.
    - hereditary, 578.
    - symptoms of, 557.
- Eye, syphilis of, conjunctiva, 548.
    - chancre of, 548.
    - conjunctivitis, 548.
    - gummata of, 550.
    - hereditary, 575.
    - lesions of, secondary, 549.
    - mucous patches of, 549.
    - ulcers of, 549.
  - of cornea, 550.
    - gummatous infiltration of, 552.
    - keratitis, interstitial, 550.
    - parenchymatous, 576.
    - punctata, 551.
  - of crystalline lens, 560.
    - hereditary, 580.
  - dacryocystitis, 542.
  - of eyelids, 545.
    - chancre of, 545.
    - course of, 546.
    - diagnosis of, 545.
    - eruptions of, 546.
    - etiology of, 545.
    - gummata of, 547.
    - hereditary, 575.
    - tarsitis syphilitica, 547.
  - hereditary, 575.
    - cataract, 580.
    - hyalitis, 580.
    - lens, disease of, 580.
    - optic neuritis, 580.
    - treatment of, 575.
    - retinitis, 580.
  - of iris, 554.
    - hereditary, 578.
    - iritis, 554.
    - prognosis of, 556.
    - treatment of, 556.
  - of lachrymal caruncle, 540.
    - gland, 539.
    - passages, 541.
  - of nasal duct, 541.
  - of ocular muscles, 567.
    - hereditary, 581.
  - of optic nerve, 563.
    - atrophy of, 565.
    - hereditary, 580.
    - neuritis descendens, 565.
    - papillitis, 563.
  - of orbital walls, 569.
    - caries of, 572.
    - gummous periostitis, 570.
    - necrosis of, 572.
    - treatment of, 574.

Eye, syphilis of, retina, 560.
    chorio-retinitis, 560.
    retinitis, central recurring, 562.
      exudative, 562.
      with hæmorrhages, 562.
      simple, 561.
  of sac, 541.
  of sclerotic, 552.
    episcleritis, 552.
    gummosa, 553.
    parenchymatosa, 553.
    treatment of, 553.
  of uveal tract, 554.
    hereditary, 578.
  of vitreous humor, 560.
    hereditary, 580.
Eyelids, syphilis of, 545.
  chancre of, 545.
  course of, 546.
  diagnosis of, 545.
  eruptions of, 546.
  etiology of, 545.
  gummata of, 547.
  hereditary, 575.
  tarsitis syphilitica, 547.
Exostosis, syphilitic, 268.
  of meatus of ear, 590.
  of orbital walls, 573.

Facial paralysis in syphilis, 488.
Fallopian tubes, syphilis of, 463.
Fauces, syphilis of (see Syphilis of Mouth).
Female organs, syphilis of, 82, 455.
Fever, syphilitic, 113.
Fissures, in syphilis of mouth, 235, 252.
Fœtus, infection of, 33, 604.
Fractures, in syphilis, 292.
Frambœsia, 202.

Generative organs, syphilis of, 437.
  hereditary, 648.
Genito-urinary system, syphilis of, 437.
  bladder, 464.
  corpora cavernosa, 443.
  epididymis and cord, 448.
    hereditary, 649.
  female organs, 455.
  kidney, 465.
    hereditary, 473.
  os uteri, 462.
  ovaries, 463.
  penis, 437.
  prostate, 447.
  scrotum, 455.
Genito-urinary system, syphilis of, seminal vesicles, 447.
  testicles, 450.
  tubes, 463.
    hereditary, 648.
  urethra, 444.
    in females, 461.
  uterus, 463.
  vagina, 461.
  vulva, 455.
Geographical distribution of syphilis, 14.
Gingivo-labial fold, chancre of, 226.
Gingivitis gummosa, 246.
Glands, syphilitic affections of, in hereditary syphilis, 645.
Glandular enlargements, general, 116.
Glassblowers, syphilis among, 64.
Glossitis, diagnosis of, 247.
  dissecans, 250.
  gummosa, 247.
  indurativa syphilitica, 250.
    diagnosis of, 251.
    treatment of, 251.
  mercurial, 239.
Gum, chancre of, 226.
  gummata of, 247.
Gummata of auricle, 587.
  of bones, 265.
  of brain, 481, 523.
  of ciliary body, 557.
  of conjunctiva, 550.
  of eyelid, 547.
  of gums, 246.
  of heart, 375.
  of iris, 555.
  of kidney, 468.
  of larynx, 341.
  of lungs, 389.
  of membrana tympani, 593.
  of mouth, 246.
  of nose, 325.
  of palate, 248.
  of rectum, 425.
  of sclerotic coat of eye, 553.
  of tongue, 247.
Gummatous, bursitis, 262.
  infiltration of tarsus of eyelid, 547.
    of cornea, 552.
  myositis, 260.
  periarteritis, 381.
  syphilide, 192.
  ulceration, of tongue, 247.
    differential diagnosis of, 249.

- Hæmorrhagic syphilis, 205.
- Hair, syphilitic affections of, 207.
  - hereditary, 648.
- Headache, syphilitic, 511.
- Heart, syphilis of, 374.
  - aneurism of, 377.
  - gummata of, 375.
  - symptoms of, 378.
- Hemiopia fugax, 566.
- Hereditary syphilis, 32, 603.
  - bacteriology of, 630.
  - bone lesions of, 280.
  - cerebral lesions of, 521.
    - intracranial affections in, 526.
  - of bronchi, lesions of, 353.
  - definition of, 603.
  - diagnosis of, 650.
  - of ear, 600.
  - of epididymis, 649.
  - of eye and its appendages, 575.
  - etiology of, 604.
  - of glands, 645.
  - of genital organs, 648.
  - of hair, 648.
  - history of, 603.
  - of kidney, 473.
  - of larynx, 353.
  - of liver, 403.
  - of lungs, 386.
  - of lymphatics, 645.
  - mortality of, 631.
  - mucous membrane, lesions of, 643.
  - of nails, 647.
  - of nervous system, 519.
  - of nose, 330.
  - of pharynx, 332.
  - prognosis of, 654.
  - of rectum, 436.
  - skin lesions in, 637.
  - of testicles, 648.
  - of thymus gland, 646.
  - of trachea, 353.
  - transmission of, from father, 66, 604.
    - from mother, 66, 620.
    - from both parents, 66, 807.
    - to second generation, 33, 621.
  - treatment of, 655.
    - feeding, 659.
    - local, 657.
    - preventive, 659.
- Herpes, recidivant, 254.
  - recurrent, in mouth, 253.
- Herpetiform pustular syphilide, 169.
- Hot baths in syphilis, 785.
- Hot Springs of Arkansas, 787.
- Hunterian chancre, 77.
- Hutchinson's teeth, 577.
- Hyalitis, 580.
- Hydrargyrism, 742.
  - acute, 742.
  - chronic, 743.
  - treatment, 745.
- Hydrarthrosis, 257.
- Hydrocephalus, in hereditary syphilis, 524, 531.
- Hyperostosis, 268, 522.
  - syphilitic, of orbital walls, 573.
- Hypertrophy of tongue in syphilis, 250.
- Hypodermic method of administering mercury, 759, 762.

- Ichthyosis, 242.
- Idiosyncrasy in relation to syphilis, 133.
- Immunity from syphilis through syphilization, 54.
- Impetigo-form pustular syphilide, 175.
- Incubation period of syphilis, primary, 72.
  - secondary, 73.
- Induration of initial lesion, 74.
- Infants, syphilis in (see HEREDITARY SYPHILIS).
- Infectio in utero, 604.
- Infection of syphilis, modes of, 54, 61, 604.
  - after conception, 618.
  - by buccal contact, 62.
    - biting, 62.
    - kissing, 62, 69.
    - sucking, 62.
  - by corporeal contact, 63.
  - from child to mother, 616.
  - in domestic life, 63.
    - care of children, 63.
    - eating and drinking, 63.
    - household effects, 63.
  - by hereditary transmission, 65, 604.
    - from the father, 66, 604.
    - from the mother, 66, 620.
    - from both parents, 66.
      - by conception, 66, 611.
      - by semen, 67.
  - in industrial life, 64.
  - by manual contact, 62.
  - by mediate contact, 63.
  - in professional life, 64.
    - circumcision, 64.
    - cupping, 65.

- Infection of syphilis, dentists' instruments, 65.
    - Eustachian catheterization, 65.
    - laryngoscopic mirrors, 65.
    - minor surgery, 65.
    - phlebotomy, 64.
    - portes caustiques, 65.
    - razor wounds, 65.
    - skin grafting, 65.
    - sounds, 65.
    - specula, 65.
    - by tattooing, 64.
    - tooth transplantation, 65.
    - by vaccination, 64, 91.
  - in social life, 62.
    - sources of, 54.
    - vehicles of, 54.
- Inhalation in treatment of syphilis, 784.
- Inoculation of syphilitic secretions, 54.
- Insanity and syphilis, 505.
- Interstitial keratitis, 550, 576.
- Intestines, syphilis of, 401.
- Inunctions of mercury, 753.
- Iodides in syphilis, 792.
  - toxic effects of, 746.
- Iodism, 746.
- Iodoform in chancroid, 879.
  - in syphilis, 802.
- Iritis, syphilitic, 554.
  - gummosa, 555.
  - hereditary, 578.
    - prognosis of, 579.
    - treatment of, 579.
  - prognosis of, 556.
  - serous, 555.
  - symptoms of, 554.
  - treatment of, 557.

- Jacksonian epilepsy in syphilis, 484.
- Jaundice in syphilis of liver, 410.
- Joints, syphilis of, 255.
  - diagnosis of, 259.
  - prognosis of, 259.
  - varieties of, 255.
    - aponeurosis, 263.
    - arthralgia, 255.
    - atrophy, 261.
    - bursitis, 262.
    - myositis, 259.
    - synovitis, serous, 256.
    - tenosynovitis, 263.

- Keratitis, syphilitic, interstitial, 550.
- Keratitis, parenchymatous, 576.
    - punctata, 551.
- Keratosis, 242, 252.
- Kidney, syphilis of, 465.
  - hereditary, 473.
  - manifestations of, early secondary, 465.
    - late secondary, 468.
  - prognosis of, 472.

- Labyrinth of ear, syphilis of, 598.
  - congenital, 600.
    - treatment of, 599, 602.
- Lachrymal apparatus, syphilis of, 539.
  - caruncle, 540.
  - hereditary, 575.
  - passages, 541.
  - sac, 541.
- Laryngeal paralysis, 344.
- Larynx, syphilis of, 337.
  - complications of, 345.
  - congenital, 353.
    - diagnosis of, 359.
    - prognosis of, 359.
    - symptoms of, 358.
    - treatment of, 360.
  - diagnosis of, 345.
  - intermediate lesions of, 341.
  - prognosis of, 348.
  - secondary lesions of, 339.
    - condylomata, 340.
    - mucous patches, 340.
  - symptoms of, 345.
  - tertiary lesions of, 341.
    - fibroid degeneration, 342.
    - gummata, 341.
    - ulceration, 343.
  - treatment of, 349.
- Lenticular papular syphilide, 157.
- Leptomeningitis, in hereditary syphilis, 527.
- Leprosy confounded with syphilis, 192.
- Leucokeratoses, 236, 242.
  - buccal, 244.
    - diagnosis of, 245.
    - treatment of, 246.
  - lingual, 242.
    - diagnosis of, 243.
    - prognosis of, 244.
- Leucoma, 236, 242.
- Leucoplakia, 242.
- Leucoplasia oris, 242.
- Lichen syphiliticus, 154.
- Life insurance, relations of syphilis to, 827.
- Lingual tonsil, syphilitic affections of, 337

Lingual tonsil, syphilis of, diagnosis, 237.
  treatment of, 237.
Lip, chancre of, 85, 224.
  diagnosis of, 225.
Liver, syphilis of, 403.
  acquired, 406.
  congenital, 403.
  diagnosis of, 410.
  jaundice in, 410.
  symptoms of, 410.
Locomotor ataxia, in syphilis, 499.
Longevity, influence of syphilis upon, 826.
Lungs, syphilis of, 383.
  acquired, 388.
  congenital, 386.
  diagnosis of, 397.
  frequency of, 397.
  gummata of, 389.
  infiltration of, diffuse, 391.
  periarteritis of, fibrous, 393.
  peribronchitis, fibrous, 393.
  symptoms of, 397.
  ulceration of, 396.
Lupus, serpiginous, 200.
  syphilitic, 188.
Lymphatics, syphilitic affections of, 116.
  in hereditary syphilis, 645.
Lymphadenitis, 870.
Lymphangitis, 869.

Macular syphilide, 147.
Maculo-papular syphilide, 148.
Malignant syphilis, 28, 29.
  precocious syphilis, 132, 144.
Mania, in syphilis, 506.
Marriage, relations of syphilis to, 831.
Maternal infection of syphilis, 66, 620.
Membrana tympani, syphilis of, 593.
  gummata of, 593.
Meningeal hæmorrhage, in hereditary syphilis, 527.
Meningitis, syphilitic, 481.
  hereditary, 526.
Meningo-encephalitis, 529.
Mental disturbances in syphilis, 505.
  dementia paralytica, 507.
  temporary, 506.
Mercury, elimination of, 791.
  insoluble salts of, 767.
  methods of its administration, 749.
    hypodermically, 759, 762.
    by inunctions, 753.
    by mouth, 749.
Mercury, soluble salts of, 762.
  toxic effects of, 742.
  vapor-bath, 784.
Mercurial baths in syphilis, 785.
Microcephalus in hereditary syphilis, 524.
Micro-organisms in syphilis, 40.
  in hereditary syphilis, 630.
  history of, 40.
  staining methods, 41.
Miliary papular syphilide, 154.
Milk from syphilitic mother, 56.
Milk-spots, 242.
"Mixed" chancre, 79, 868.
Monkeys, experimental inoculation of, 59.
Mouth, syphilis of, 223.
  consecutive symptoms of early, 229.
    diagnostic features of, 237.
    dry and scaly lesions of, 235.
    erythema, 227.
    erythemato-erosive syphilide, 228.
    fissures in, 235, 252.
    mucous plaques, 229.
    papular syphilide, 229.
    prophylaxis of, 240.
    pustular syphilide, 233.
    tubercular syphilide, 234.
    ulcerating syphilide, 234.
  consecutive symptoms of late, 241.
    gummata, 246.
    leucokeratoses, 236, 242.
    parasyphilitic manifestations of, 251.
Mucous patches (see Mucous Plaques).
Mucous plaques, 164, 229.
  of conjunctiva, 549.
  diagnosis of, 232.
  of mouth, 229.
  of nose, 324.
  papulo-erosive, 230.
    hypertrophic, 230.
    hypertrophic ulcerative, 231.
  of rectum, 419.
  of skin, 164.
  treatment of, 232.
Multiple cerebro-spinal syphilis, 502.
Muscles, syphilis of, 260.
  atrophy of, 261.
  chronic interstitial, 260.
  diagnosis of, 261.
  gummatous, 260.
  irritative, 260.
  ossificans, 261.
Myelitis, syphilitic, 496.
Myositis, syphilitic, 260.

- Myositis, syphilitic, chronic interstitial, 260.
  - diagnosis of, 261.
  - gummatous, 260.
  - irritative, 260.
  - ossificans, 261.
- Nails, syphilitic affections of, 217, 647.
- Nasal duct, syphilis of, 541.
  - stricture of, 542.
- Navy, statistics of syphilis in, 815.
- Nephritis, syphilitic, 466.
- Nervous system, syphilis of, 475.
  - of brain and its meninges, 481.
  - of cortex and its meninges, 482.
  - of crus, 488.
  - of medulla, 488.
  - of pons, 488.
    - in hereditary form, 526, 528.
    - symptomatology, 483.
  - cerebro-spinal, multiple, 502.
  - hereditary, 519.
    - asymmetry of cranium, 524.
    - brain, affection of, 528.
    - cerebral lesions of, 521.
    - diagnosis of, 535.
    - hydrocephalus, 524, 531.
    - intracranial affections of, 526.
    - meninges, affections of, 526.
    - mental affections of, 529.
    - microcephalus, 524.
    - osteitis, 522.
    - paralysis, central, 532.
    - peripheral lesions of, 537.
    - rachitis, 524.
    - spinal lesions of, 536.
  - mental disturbances following, 505.
    - dementia paralytica, 507.
      - temporary, 506.
  - pathological anatomy of, 478.
    - general considerations of, 478.
  - peripheral, 510.
    - diagnosis of, 513.
    - prognosis of, 514.
    - treatment of, 515.
  - of spinal cord and its coverings, 493.
    - pathological anatomy of, 493.
    - symptomatology, 494.
    - tabes and syphilis, 499.
- Neuralgia, syphilitic, 510.
- Nodes, syphilitic, 268.
  - Parrot's, 274.
- Nose, syphilis of, 323.
  - acquired, 324.
  - complications of, 326.
- Nose, syphilis of, congenital, 330.
  - diagnosis of, 329.
  - erythema, 324.
  - fibroid degeneration of, 325.
  - gummata of, 325.
  - infiltration of, diffuse, 325.
  - mucous patches in, 324.
  - primary lesion of, 324.
  - rhinitis in, 324.
  - secondary lesions of, 324.
  - sequelæ of, 326.
  - symptoms of, 325.
  - tertiary lesions of, 324.
  - treatment of, 330.
  - ulceration of, deep, 325.
- Notched teeth in hereditary syphilis, 577.
- Nummular papular syphilide, 158.
- Nurses, infected by syphilitic infants, 659.

- Ocular muscles, syphilis of, 566.
- Oculomotor nerves, syphilis of, 566.
- Oculomotor palsies, 490.
- Œsophagus, syphilis of, 400.
- Onychia, syphilitic, 217.
  - complete, 219.
  - diagnosis of, 221.
  - hereditary, 647.
  - hypertrophic, 220.
  - onyxis craquelé, 217.
  - partial, 218.
  - treatment of, 221.
  - varieties of, 217.
- Ophthalmoplegia, 490, 538, 568.
- Optic nerve, syphilis of, 563.
  - atrophy of, 565.
    - cerebral, 565.
    - inflammatory, 565.
    - spinal, 565.
  - hereditary, 580.
  - neuritis descendens, 565.
    - bilateral, 565.
    - unilateral, 565.
  - papillitis, 563.
- Orbital walls, syphilis of, 569.
  - caries of, 572.
  - exostosis of, 573.
  - gummous periostitis of, 570.
  - hereditary, 581.
  - hyperostosis of, 573.
  - necrosis of, 572.
  - periostosis of, 572.
  - treatment of, 581.
- Orchitis, syphilitic, 450, 648.

Osseous system, syphilis of, 1, 265.
  acquired, 274.
    in primary stage, 274.
    in secondary stage, 275.
    in tertiary stage, 276.
  differential diagnosis of, 290, 297.
  fractures, 292.
  gummata of, 265.
  hereditary, 280.
  osteitis, atrophic, 522.
    formative, 268.
    osteophytic, 522.
    rarefying, 267.
    specific, 267.
  osteomyelitis, 270.
  periostitis, 266.
  prognosis of, 301.
  treatment of, 302.
Ostealgia, syphilitic, 294.
Osteitis, syphilitic, atrophic, 522.
  formative, 268.
  osteophytic, 522.
  rarefying, 267.
  specific, 267.
Osteocopic pains, 294.
Osteomyelitis, syphilitic, 270.
Osteophytes, syphilitic, 268, 522.
Os uteri, syphilis of, 462.
  differential diagnosis of, 463.
Otitis, in syphilis, 594.
  catarrhalis adhæsiva, 596.
  catarrhalis secernens, 594.
    treatment of, 595.
  media suppurativa, 595.
    treatment of, 596.
Ovaries, syphilis of, 463.

Palate, chancre of, 227.
  gummata, 248.
    diagnosis of, 250.
    treatment of, 250.
Palmar and plantar papular syphilide, 161.
Panaris, syphilitic, 304.
Pancreas, syphilis of, 414.
Papillitis, 563.
Papular syphilide, 151, 229.
  anatomy of, 153.
  lenticular, 157.
  miliary, 154.
  moist, 164.
  nummular, 158.
  palmar and plantar, 161.
  papulo-squamous, 159.
Papule, moist (see Mucous Plaque).
Papulo-squamous syphilide, 159.
Paralysis, central, in hereditary syphilis, 533.
  of ocular muscles, 490, 537.
Paralysis of the insane in syphilitic subjects, 507.
Paraphimosis, 874.
Paraplegia, syphilitic, 498.
Parasyphilitic manifestations, 139.
  of mouth, 251.
    cicatrices, 252.
    fissures, 252.
    herpes, recurrent, 253.
    keratosis, 252.
    pemphigus linguæ, 254.
    ulcerations, 254.
Parenchymatous keratitis, 576.
Paronychia, syphilitic, 212.
  diagnosis of, 216.
  dry, 213.
  inflammatory, 214.
  treatment of, 216.
  ulcerative, 215.
Pemphigus linguæ, 254.
  syphiliticus neonatorum, 651.
  vegetans, 202.
Penis, syphilis of, 437.
  differential diagnosis of, 439.
  initial lesions of, 437.
    situation of, 437.
  manifestations of, secondary, 438.
    late, 439.
Perianal chancroid, 894.
Periarteritis, fibrous, of lungs, 393.
  gummatous, 381.
Peribronchitis, fibrous, of lungs, 394.
Pericardium, syphilis of, 374.
Periosteo-genesis, 289.
Periostitis, syphilitic, 266.
Peripheral nervous system, syphilis of, 510.
  diagnosis of, 513.
  hereditary lesions of, 537.
  prognosis of, 514.
  treatment of, 515.
Peritonitis in syphilis, 402.
Phagedena, 875.
Phagedenic chancroid, 897.
  acute, 897.
  chronic, 897.
  complications of, 899.
  treatment of, 898.
Pharynx, syphilis of, 331.
  acquired, 331.

- Pharynx, syphilis of, congenital, 332.
  - diagnosis of, 336.
  - primary lesions of, 331.
  - prognosis of, 336.
  - secondary lesions of, 332.
  - tertiary lesions of, 332.
  - treatment of, 336.
- Phimosis, 874.
- Phthisis, laryngeal, 345.
- Pigmentary, syphilide, 202.
- Pityriasis, syphilitic, 159.
- Placenta, syphilis of, 369.
- Plaques, mucous, 164, 229.
  - diagnosis of, 232.
  - of mouth, 229, 241.
  - opaline, 236, 242.
  - papulo-erosive, 230.
  - papulo-hypertrophic, 230.
  - papulo-ulcerative, 231.
  - of skin, 164.
  - treatment of, 232.
- Polymorphism of syphilides, 126.
- Post-syphilitic manifestations, 139, 251.
- Potassium iodide, in syphilis, 792.
- Pregnancy and syphilis, 618.
- Prepuce, chancre of, 81, 437.
  - late syphilitic lesions of, 439.
- Primary syphilis, 71.
  - adenopathy in, 80.
  - duration of, 71.
  - first incubation period of, 72.
  - initial lesion of, 73.
    - diagnosis of, 86, 88.
    - induration of, 74.
    - number of, 75.
    - varieties of, 76.
  - location of lesion in, 68, 81.
  - second incubation period of, 73.
    - theory of, 99.
- Profeta's law, 52.
- Prostate, syphilis of, 447.
- Prostitution, regulation of, 838.
  - in France, 838.
  - by legislation, 842.
  - other measures, 845.
  - in Russia, 840.
- Pseudo-paralysis in syphilis, 292.
- Psoriasis, palmaris and plantaris, 163.
- Public health, its relation to syphilis, 813.
  - statistics, value of, 814.
- Purpura in syphilis, 205.
- Pustular syphilide, 169, 233.
  - acne-form, 174.
- Pustular syphilide, ecthyma-form, 77.
  - eczematous, 169.
  - herpetiform, 169.
  - impetigo-form, 175.
  - rupial, 181.
  - varicella-form, 172.
  - variola-form, 173.
- Pustulo-ulcerous syphilide, 182.
- Pustules, syphilitic, 55.
- Pyogeneous microbes and syphilis, 48, 137.

- Rachitis in hereditary syphilis, 525.
- Rectitis proliferante syphilitique, 428.
- Rectum, syphilitic affections of, 417.
  - chancre of, 417.
    - chancroid of, 896.
  - congenital, 436.
  - gummata of, 425.
  - manifestations of, secondary, 419.
  - stricture of, 428.
    - diagnosis of, 431.
    - pathology of, 430.
    - treatment of, 432.
  - syphilitique proliferante rectitis, 428.
  - syphiloma, ano-rectal, 426.
  - ulceration of, secondary, 421.
- Registration of prostitutes, 838.
- Reinfection, syphilitic, 133, 628.
- Respiratory system, syphilis of larynx, 337.
  - lungs, 383.
  - nose, 323, 330.
  - trachea and bronchi, 350.
- Retina, syphilis of, 560.
  - central recurring, 562.
  - chorio-retinitis, 560.
  - exudative, 561.
  - hereditary, 580.
  - retinitis, simple, 561.
  - with hæmorrhages, 562.
- Retrogressive syphilis, 132.
- Rhinitis in syphilis, 324.
- Rickets, connection of, with syphilis, 525.
- Roseola, syphilitic, 147.
- Rupial pustular syphilide, 181.
- Russia, syphilis in, 840.

- Saliva, in syphilis, 55.
- Salivation, in syphilis, 239, 742.
- Sclerotic coat of eye, syphilis of, 552.
  - episcleritis, 552.
  - gummosa, 553.
  - hereditary, 576.
  - parenchymatosa, 543.

Sclerotic coat of eye, syphilis of, treatment of, 553.
Scrofula and syphilis, 136.
Scrofulous diathesis and syphilis, 136.
Scrotum, syphilis of, 455.
Seborrhœa and syphilis, 135.
Secondary lesions of syphilis,
  of conjunctiva, 549.
  differential diagnosis of, 92.
  of epididymis, 452.
  infectious nature of, 54.
  of kidney, 465.
  of larynx, 339.
  of nose, 324.
  of penis, 438.
  of pharynx, 332.
  of rectum, 419.
  of vulva, 456.
Second infection of syphilis, 133, 628.
Secretions of syphilitics, pathological, 56.
  physiological, 55.
Semen of syphilitics, 56.
Seminal vesicles, syphilis of, 447.
Serpiginous syphilide, 198.
  deep, 199.
  superficial, 199.
Shaving, syphilitic inoculation through, 65.
Skin, syphilis of, 125.
Skin-grafting, syphilitic inoculation through, 65.
Smallpox and syphilis, 173.
Smokers' patches, 236, 242, 245.
Soft palate, chancre of, 227.
Sources of syphilitic contagion, 54.
Spermatic cord, syphilis of, 448.
Spinal cord, syphilis of, 493.
  Erb's type of, 498.
  hereditary lesions of, 536.
  myelitis, 493.
  pathological anatomy of, 493.
  symptomatology, 494.
  tabes and syphilis, 499.
Spleen, syphilis of, 412.
Statistics, of syphilis, 814.
  comparison of, 821.
  in general hospitals, 814.
  in India, 819.
  mortality of, in England, 822.
  in United States army, 818.
  in United States marine hospital service, 815.
  in United States navy, 819.
Stellate syphilide, 158.
Stomach, syphilis of, 400.
Stomatitis, mercurial, 239, 742.
  ulcerosa, 234.
Stricture of rectum, syphilitic, 428.
  diagnosis of, 431.
  of nasal duct, 542.
  pathology of, 430.
  treatment of, 432.
Suckling, infection through, 63.
Sulphur waters and syphilis, 135.
Suprarenal capsules, syphilis of, 415.
Surgical operations, infection through, 64.
Sweat as a vehicle of syphilis, 55.
Synovitis, serous, in syphilis, 256.
  acute polyarticular, 256.
Syphilides, the, 125,
  classification of, 144.
  en cocarde, 158.
  corneous, 162.
  crustaceous, 160.
  diagnosis of, 142.
  erythemato-erosive, of mouth, 228.
  erythematous, 147.
    macular, 147, 639.
    maculo-papular, 148.
  etiological considerations of, 133.
    age, 134.
    alcoholism, 134.
    climate, 134.
    constitutional peculiarity, 133.
    diathesis, 135.
    drugs, 135.
    intercurrent maladies, 136.
    local causes, 136.
    physiological crisis, 134.
    pyogenous microbes, 137.
    secondary changes, 137.
    sex, 134.
    structural peculiarities, 137.
  evolution of, regular, 129.
    unusual, 132.
  general morbid anatomy of, 140.
  general symptomatology of, 125.
  gummatous, 192.
    anatomy of, 196.
    diagnosis of, 197.
    evolution of, 194.
  hæmorrhage complicating, 205.
  in hereditary syphilis, 637, 641.
  papular, 151, 229, 639.
    anatomy of, 153.
    lenticular, 157.
    miliary, 154, 640.

- Syphilides, moist, 164.
    - nummular, 157.
    - palmar and plantar, 161.
    - papulo-erosive, of mouth, 230.
    - papulo-squamous, 159.
    - hypertrophic, of mouth, 230.
    - ulcerative, of mouth, 230.
  - papuleuse végétante, 160.
  - parallel between secondary and tertiary, 130.
  - pigmentary, 202.
    - diagnosis of, 205.
  - prognosis of, 143.
  - pustular, 169, 223.
    - acne-form, 174.
    - anatomy of, 171.
    - ecthyma-form, 177.
    - eczematous, 169.
    - herpetiform, 169.
    - impetigo-form, 175.
    - rupial, 181.
    - varicella-form, 172.
    - variola-form, 173.
  - pustulo-ulcerous, 182.
  - serpiginous, 198.
    - deep, 199.
    - diagnosis of, 200.
    - superficial, 199.
  - special characteristics of, 126.
    - absence of pain and itching, 128.
    - cicatrices, 128.
    - color, 127.
    - configuration and grouping, 126.
    - crusts, 128.
    - evolutionary mode, 126.
    - pigmentation of skin, 128.
    - polymorphism, 126.
    - scales, 128.
    - symmetry, 126.
    - ulcerations, 128.
  - stellate, 158.
  - treatment of, 144, 803.
  - tubercular, 184, 233.
    - atrophic, 186.
    - dry, 186.
    - ulcerative, 186–234.
  - variations in, 131.
  - vegetating, 201.
    - diagnosis of, 201.
  - vesicular, in hereditary syphilis, 639.
- Syphilis, acquired, bone lesions of, 265, 274.
  - abortive treatment of, 715.
  - adenopathy in primary, 80, 116.
- Syphilis of air-passages, upper, 317.
  - alopecia in, 207, 648.
  - in animals, 58.
  - of anus, 417.
  - of aponeuroses, 263.
  - of appendages of skin, 207.
  - baths in, 785.
  - of bladder, 464.
  - of blood-vessels, 378.
  - of bones, 265, 274.
  - of brain and meninges, 481.
  - of bronchi, 350.
  - of bursæ, 262.
  - benignant, 25.
  - benign rapid, 132.
  - cachexia of, 120.
  - cerebral, 481, 521.
  - cerebro-spinal multiple, 502.
  - change in character of, 688.
  - of choroid, 558.
    - hereditary, 579.
  - of ciliary body, 557.
    - hereditary, 578.
  - Colles's law in, 32, 66, 614.
  - congenital, 32, 65, 603.
  - of conjunctiva, 548.
    - hereditary, 575.
  - constitutional, 105.
    - treatment of, 725.
  - contagion of (see INFECTION OF SYPHILIS).
  - continuous treatment of, 728.
  - of cornea, 550.
    - hereditary, 576.
  - of corpora cavernosa, 443.
  - of crystalline lens, 560.
  - demographic relations of, 833.
  - diagnosis of, 664.
    - hereditary, 681.
    - in primary stage, 670.
    - in secondary stage, 673.
    - in tertiary stage, 677.
  - definition of, 1.
  - duration of first incubation period, 72, 110.
    - second incubation period, 73, 105.
    - syphilodermata period, 111.
  - of ear, 583.
  - of epididymis and cord, 448.
  - etiology of, 39.
  - evolution of, 20.
    - course and stages of, 20.
  - expectant treatment of, 727.
  - of eye and its appendages, 539.
    - hereditary, 575.

- Syphilis of eyelids, 539.
  - hereditary, 575.
- of female organs, 455.
- of fingers and toes, 304.
- fractures in, 292.
- "galloping," 30.
- general considerations of visceral syphilis, 365.
- geographical distribution of, 14.
- of generative organs, 437.
- of genito-urinary system, 437.
- of hairs, 207, 648.
- hæmorrhagica, 205.
- health, its influence upon, 826.
- of heart, 374.
- hereditary, 32, 65, 603.
  - bacteriology of, 630.
  - bone lesions of, 280.
  - etiology of, 604.
  - mortality of, 631.
- history of, 1.
- hypodermic treatment of, 759, 762.
- incubation period of, 72,
  - primary, 72.
  - secondary, 73.
- initial lesion of, 73.
  - diagnosis of, 86, 88.
  - induration of, 74.
  - location of, 68, 81.
  - number of, 75.
  - varieties of, 76.
- insontium, 67, 830.
- interrupted treatment of, 730.
- of intestines, 401.
- of iris, 554.
  - hereditary, 578.
- of joints, 255.
- of kidney, 465.
- of labyrinth of ear, 598, 600.
- of larynx, 337.
- legislation in relation to, 709.
- life insurance, its relations to, 827.
- longevity, its influence upon, 826.
- of lingual tonsil, 237.
- of liver, 403.
- of lungs, 383.
- of lymphatics, 116.
  - hereditary, 645.
- malignant, 28.
  - precocious, 132.
- marriage, relations to, 831.
- of membrana tympani, 593.
- mental disturbances following, 505.
- Syphilis, micro-organisms in, 40.
  - in hereditary form, 630.
- modes of infection, 54, 61, 603.
- of motor nerves of eye, 566.
- of mouth, 223.
- of muscles, 260.
  - ocular, 566, 581.
- of nails, 212.
  - hereditary, 647.
- of nervous system, 475.
  - hereditary, 519.
  - peripheral, 510, 537.
- of nose, 323.
  - hereditary, 330.
- of œsophagus, 400.
- onychia in, 217.
  - hereditary, 647.
- of optic nerve, 563.
  - hereditary, 580.
- of orbital walls and contents, 569.
  - hereditary, 581.
- of ovaries, 463.
- of pancreas, 414.
- paralyses, central, 532.
- paronychia in, 212.
- pathological anatomy of, general, 34.
- of pericardium, 374.
- of pharynx, 331.
- of placenta, 369.
- predisposing causes of, 53.
  - age, 53.
  - alcoholism, chronic, 53.
  - chronic diseases, 53.
  - malaria, 53.
  - resisting power of individual, 53.
  - tuberculosis, 53.
- preventive treatment of, 659.
- primary period of, 71.
  - duration of, 71.
- Profeta's law in, 52.
- prognosis of, 686.
- prophylactic treatment of, 714.
- of prostate, 447.
- pseudo-paralysis of, 292.
- public health, its relations to, 813.
- of rectum, 417.
- reinfection of, 133, 628.
- repressive measures for prevention of, 837.
- of retina, 560.
- retrogressive, 132.
- of sclerotic coat of eye, 552.
  - hereditary, 576.
- of scrotum, 455.

- Syphilis, secondary, 51.
  - of seminal vesicles, 447.
  - of skin, 125.
    - hereditary, 637.
  - socio-economic relations of, 825.
  - of spermatic cord, 448.
  - of spinal cord, 493.
    - hereditary, 536.
  - of spleen, 412.
  - stages of, 20.
  - statistics of, 815.
  - of stomach, 400.
  - of suprarenal capsules, 415.
  - systematic treatment of, 732.
  - of tendons, 263.
  - tertiary, 52.
  - of testicle, 450, 648.
  - theory of, 99.
  - of tongue, 223.
  - of trachea, 351.
  - transmission of hereditary, 66, 604.
    - to second generation, 621.
  - traumatism, its relations to, 121.
  - treatment of, 709.
    - abortive, 715.
    - baths, 785.
    - constitutional, 725.
    - continuous, 728.
    - expectant, 727.
    - by heat, 785.
    - of hereditary syphilis, 655, 807.
    - hypodermic, 759, 762.
    - hygienic measures in, 740.
    - interrupted, 730.
    - by inunctions, 753.
    - local, 801.
    - preventive, 659.
    - proper time for beginning, 715.
    - prophylactic, 714.
    - systematic, 732.
    - of tubes, 463.
    - of tympanum, 593.
    - of urethra, 444.
      - female, 461.
    - of uterus, 463.
      - os, 462.
    - of uveal tract, 554, 578.
    - vaccination, 91.
    - of vagina, 461.
    - by vaporization, 785.
    - of viscera, 365.
    - of vitreous humor, 560.
    - of vulva, 455.
- Syphilitic adenopathy, primary, 80, 116.
  - alopecia, 207, 648.
    - of axilla, 210.
    - of beard, 210.
    - cranial, 208.
    - diagnosis of, 210.
    - of eyebrows and eyelashes, 210.
    - of genitals, 210.
    - prognosis of, 212.
    - treatment of, 212.
  - arterio-sclerosis, 378.
  - arthritis, 255.
  - asthma, 378.
  - bubo, 80.
  - bursitis, 263.
  - cachexia, 120.
  - choroiditis, 558.
    - hereditary, 579.
  - cochlitis, 599.
  - conjunctivitis, 548.
    - hereditary, 575.
  - contagion, sources of (see INFECTION OF SYPHILIS).
  - cyclitis, 557.
    - hereditary, 578.
  - dactylitis, 304.
  - endarteritis, 380.
  - enostosis, 268.
  - exostosis, 268.
  - fever, 113.
  - headache, 511.
  - hyperostosis, 268.
  - iritis, 554.
    - hereditary, 578.
  - labyrinthitis, 600.
  - lesions, secondary pyogenic infection of, 48.
  - lupus, 188.
  - meningitis, 481.
  - myelitis, 493.
  - myositis, 260.
  - nephritis, 466.
  - neuralgia, 510.
  - nodes, 268.
  - onychia, 217, 647.
    - diagnosis of, 221.
    - treatment of, 221.
    - varieties of, 217.
  - orchitis, 450, 648.
  - osteomyelitis, 270.
  - osteophytes, 268.
  - panaris, 304.
  - paraplegia, 498.
  - paronychia, 212.

Syphilitic, paronychia, diagnosis of, 216.
    dry, 213.
    inflammatory, 214.
    treatment of, 216.
    ulcerative, 215.
  periarteritis, 381.
  periostitis, 266.
  pityriasis, 159.
  primary lesion, 73.
  pseudo-paralysis, 292.
  pustules, 55.
  reinfection, 133, 628.
  retinitis, 560.
  roseola, 147.
  scleritis, 552.
    hereditary, 576.
  secondary lesions, infectious nature of, 54.
  secretions, physiological, 55.
    pathological, 56.
  stricture of nasal duct, 542.
    of rectum, 428.
  teeth, 577.
  tertiary lesions, infectious nature of, 57.
Syphilization, 54.
Syphiloderma (see SYPHILIS OF SKIN).
Syphiloma, ano-rectal, 426.

Tabes and syphilis, 499.
Tarsitis syphilitica, 547.
Tattooing, syphilitic inoculation through, 64.
Teeth, in hereditary syphilis, 577.
Tendons, syphilis of (see TENOSYNOVITIS).
Tenosynovitis, syphilitic, 263.
  acute, irritative, 263.
  chronic, 263.
  gummatous, 263.
Tertiary lesions of syphilis, 52.
  causes of, 138.
  frequency of, 138.
  infectious nature of, 57, 139.
  of larynx, 341.
  of nose, 324.
  of pharynx, 332.
  syphilides, in hereditary syphilis, 641.
Testicle, syphilis of, 450, 648.
  atrophy of, 649.
  course of, 451, 648.
  diagnosis of, 453, 649.
  gummatous formations in, 451.
  hereditary, 648.
Throat, in hereditary syphilis, 333.
Thymus, in hereditary syphilis, 646.
Tongue, chancre of, 226.
Tongue, chancre of, diagnosis of, 226.
    treatment of, 226.
  gummata, 247.
    diagnosis of, 247.
  gummous ulceration of, 247.
    differential diagnosis of, 249.
  hypertrophy, 250.
  induration of, syphilitic, 250.
  pemphigus of, 254.
Tonsil, chancre of, 85.
  lingual, syphilitic affections of, 237.
    diagnosis of, 237.
    treatment of, 237.
Trachea, syphilis of, 351.
  pathology, anatomy of, 351.
  prognosis of, 353.
  symptoms of, 353.
Transmission of syphilis to second generation, 33, 621.
  to third generation, 33.
Transmissive power in syphilis, 833.
Traumatism, its relation to syphilis, 121.
Tubercular syphilide, 184, 233.
  atrophic, 186.
  dry, 186.
  ulcerative, 186, 234.
Tubes, fallopian, syphilis of, 463.
Tylosis, 242.

Ulceration of syphilitic lesions, 128.
  of conjunctiva, 549.
  of mouth, 254.
Ulcus durum. 77.
Urethra, syphilis of, 444.
  chancre of, 444.
  differential diagnosis, 445.
  female, 461.
  symptoms of, late, 445.
Urinary organs, syphilis of, 437.
Uterus, syphilis of, 463.
  chancre of, 82.
  of os, 462.
    differential diagnosis of, 463.
Uveal tract, syphilis of, 554, 578.
  hereditary, 578.
Unicist theory, 21, 79, 105.

Vaccination and syphilis, 64, 91.
Vaccine lymph as vehicle of contagion, 91.
Vagina, syphilis of, 461.
  initial lesion of, 83, 461.
Varicella-form pustular syphilide, 172.
Variola-form pustular syphilide, 173.

Vegetating syphilide, 201.
Vegetations, 888.
Vehicles of syphilitic contagion, 54.
Veins, syphilis of, 378.
Venereal ulcers, comparison of, with their source, 86.
Venereal warts (see CONDYLOMATA).
Vertigo, in syphilis, 203.
Vesiculæ seminalis, syphilis of, 447.
Vesicular syphilides, in acquired syphilis, 146, 169.
  in hereditary syphilis, 639.
Vibrio lineola, 40.
Vitreous humor, syphilis of, 560.
  inflammation of, in hereditary syphilis, 580.
Viscera, syphilis of, 365.
  of bladder, 464.
  of blood-vessels, 378.
  general consideration of, 365.
  of heart, 374.
  of intestines, 401.
  of kidney, 465.
    manifestations of, early secondary, 465.
Viscera, syphilis of, liver, 403.
    acquired, 406.
    congenital, 403.
  of lungs, 383.
    acquired, 388.
    congenital, 386.
  of œsophagus, 400.
  of pancreas, 414.
  of pericardium, 374.
  of placenta, 369.
  of spleen, 412.
  of stomach, 400.
  of suprarenal capsules, 415.
Vulva, syphilis of, 455.
  differential diagnosis of, 460.
  initial lesion of, 455.
  manifestations of secondary, 456.
    late, 457.

Warts, venereal (see CONDYLOMATA).
Wet nurses, infection through, 63.

Yaws, 201.

THE END.

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